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ABSTRACT

Developed as a result of an institute on rehabilitation issues, this document is a guide to assistive technology as it affects successful competitive employment outcomes for people with disabilities. Chapter 1 offers basic information on assistive technology including basic assumptions, service provider approaches, options for technology provision, and costs and benefits. Chapter 2 focuses on the pivotal role of the consumer, stressing the importance of attitude, the awareness process, and approach. Chapter 3 considers the assistive technology team including the counselor, consumer, rehabilitation technologist, employer, and others. The following chapter examines administrative challenges with emphasis on the importance of listening and then taking necessary actions. Chapter 5 is on application of assistive technology for the consumer and covers technology applications in the vocational rehabilitation process and employment, home-based employment, and marketplace issues. Chapter 6 considers some innovative approaches to assistive technology such as equipment loan banks, used equipment exchanges, and telecommunication device distribution programs. Chapter 7 addresses the legislative foundation of assistive technology including 18 specific laws or regulations such as the Rehabilitation Amendments of 1998. Chapter 8 lists additional information resources including Internet resources, related projects, and rehabilitation engineering research centers. (Contains 32 references.) (DB)

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Rehabilitation Services Administration

Achieving Successful Employment Outcomes With the Use Of Assistive Technology

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Date: February, 1999

To: Colleagues in Vocational Rehabilitation

From: Daniel C. McAlees
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Re: 24th Institute on Rehabilitation Issues (IRI) Document

Enclosed is a complimentary copy of the 24th Institute on Rehabilitation Issues document, produced by the Research and Training Center at the University of Wisconsin-Stout, **Achieving Successful Employment Outcomes With the Use of Assistive Technology**

We are pleased to send this to you for your review and utilization as appropriate. Do not hesitate to contact us with your comments.

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Report from the Study Group on

Achieving Successful Employment Outcomes With the Use Of Assistive Technology

Twenty-Fourth Institute on Rehabilitation Issues
Washington, DC
May, 1998

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Use of Technology to Aid Clients in Employment
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Foreword

Rehabilitation Services Administration (RSA) and the Council of State Administrators of Vocational Rehabilitation (CSAVR) charged the Prime Study Group to develop a document that explores how vocational rehabilitation professionals can use innovative and routine applications of assistive technology to enhance services to consumers and employers that lead to competitive employment.

The growth in the use of assistive technology in vocational rehabilitation services is a reflection of what is required for success in today's workplace. As the twentieth century closes and the twenty-first century opens, technology is the means by which business gets accomplished. However, for people with disabilities, use of assistive technology is not merely an efficient way to complete a work-related task; it may be the only way many consumers will be able to achieve successful, competitive employment outcomes and independence within the community.

Basic precepts used by the Prime Study Group in writing this document include the following:

- As technology changes, the population for whom assistive technology is appropriate will likely expand.
- Assistive technology is not a "one time thing."
- Assistive technology is a continuous process that constantly changes.
- Assistive technology is not necessarily just a vocational rehabilitation responsibility.
- Assistive technology is a team responsibility.

In the federal-state partnership, public rehabilitation programs use the term *rehabilitation technology*, which includes rehabilitation engineering, assistive technology devices, and assistive technology services. The term *assistive technology* is used consistently throughout federal legislation. This document will focus on the role of assistive technology as it impacts successful competitive employment outcomes.

Acknowledgments

Many people and a number of agencies were involved in the development of this IRI study. A summary of the IRI process follows to help the reader understand this involvement.

The IRI process begins with the solicitation of topics for the Prime Study Groups to study. We acknowledge the efforts of the Council of State Administrators of Vocational Rehabilitation (CSAVR), the Rehabilitation Services Administration (RSA), and state vocational rehabilitation agency administrators who submitted topics for study consideration.

The IRI National Planning Committee meets, discusses the topics, and selects those determined to be the most relevant for study. We acknowledge and appreciate the work that was done by that committee.

We wish to thank the state vocational rehabilitation administrators who nominated individuals to serve on this Prime Study Group. Serving on a study group is a considerable commitment in time and effort, and we appreciate the fact that state administrators allowed their employees time to participate in this group.

Most importantly, we want to thank the members of the Prime Study Group responsible for this document (see page iii). These are the real authors who did the thinking, critiquing, writing, and rewriting of 100 percent of the content. This publication represents their hard work throughout the year, which included three meetings of several days each and involved many hours in between those meetings to complete writing assignments.

We wish also to acknowledge the work of the Full Study Group (listed on page v). These individuals took the time to read, discuss, and critique this document. Their feedback was invaluable for further improving the quality of this document.

In addition, we acknowledge the hard work done by a previous IRI Prime Study Group (page vii) and our utilization of ideas and thinking from that unpublished document.

This editor wishes to personally thank three individuals who, in addition to serving as members of the Prime Study Group, also agreed to assist me on the Editorial Committee, the last step in finalizing the content of the document. Helping me put the "finishing touches" on this document were Peggy Anderson of the Alabama Department of Rehabilitation Services, who as chairperson had so capably guided the document's development; Roger Levy of the Texas Rehabilitation Commission Programs; and Rachel Wobschall, of the Minnesota STAR Program.

Finally, Jean Davis of the Center for Continuing Education staff composed this document. The attractive appearance of the document you are about to read speaks for her efforts.

Jean Radtke
IRI Study Group Coordinator and Editor

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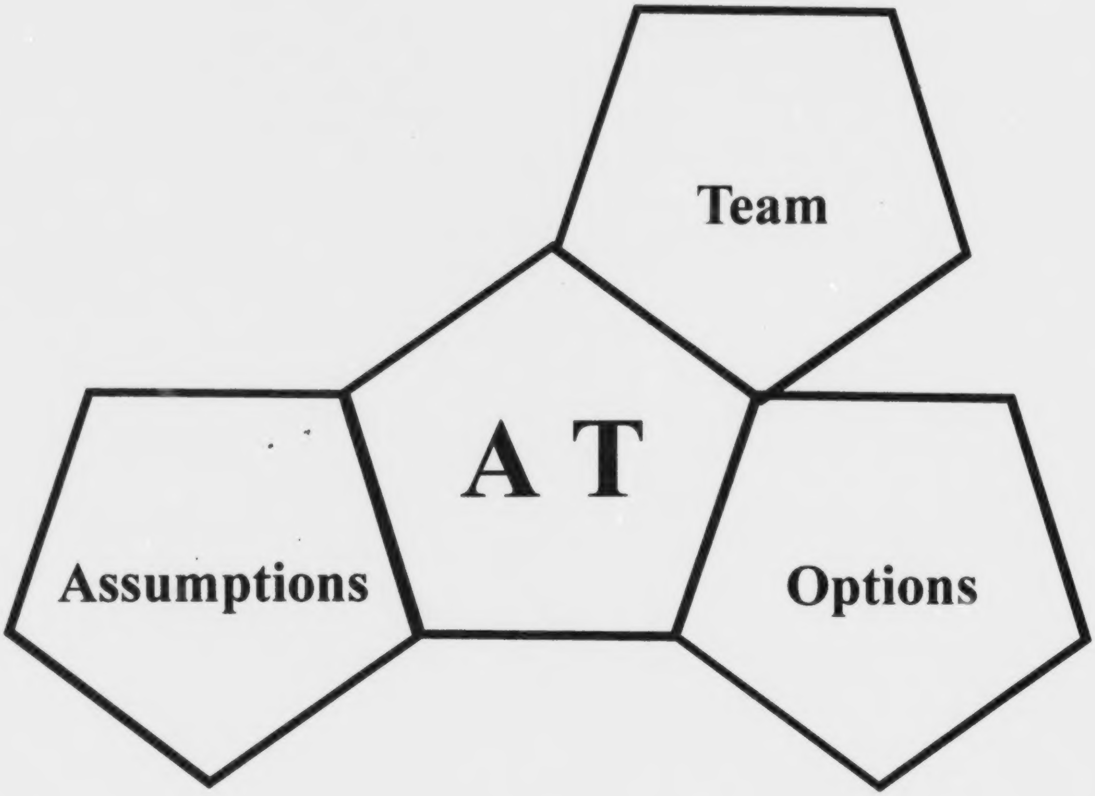
Chapter I
Assistive Technology: The Basics



Introduction

This chapter focuses on those who benefit from technology and those comprising the assistive technology team. Basic assumptions in the use of technology, available options, and the hierarchy of assistive technology services are reviewed to support building a bridge among the various entities who use, purchase, or recommend technology solutions to enhance human potential and competitive employment outcomes.

Who Benefits

The Consumer

A prevalent misconception is that only certain types of people can benefit from assistive technology (AT). Historically, modifications focused on accommodations for those with mobility, hearing, and visual impairments (Mancuso, 1995, p. 2). The rapid expansion in communications technology in the last two decades has created tools for persons with disabilities to engage in occupations that were once considered unattainable to them. Similar breakthroughs in industrial settings, with hoists for lifting and power or specialty tools, reduce the strength needed to complete a task. Specialty equipment and strategies such as robotics, ergonomic hammers, and human factors assessment for proper work flow and positioning, lower the physical demands of work tasks, widen the potential work force, and prevent disabling injuries. Individuals who may not be physically strong, or who have limitations imposed because of a disability, are now able to compete for specific industrial positions. Technology is also permitting workers who become disabled to retain and return to their jobs. An example of this is a person who was a farmer before having a spinal cord injury. Return to this type of work would have been out of the question until recently, when lifts that provide modifications for access to a tractor and accessible tractors were made available in the marketplace.

At the end of 1994, 20.6 percent of the population, about 54 million people, had some level of disability; 9.9 percent, or 26 million people, had a significant disability (McNeil, 1997). These numbers are expected to increase as the baby boomers age. Public rehabilitation agencies are required to provide services for eligible persons with severe disabilities. This charge, along with changes in regulations concerning presumed employment potential, makes the consideration to use technology even more crucial.

The Rehabilitation Professional

Technology performs a dual role for the rehabilitation professional. The benefit of attaining goals and opening new doors for consumers has been the primary thrust in the provision of technology. The other, and equally important, aspect of technology is its use in casework and for case services. A number of state agencies are addressing the issue by reengineering or simplifying their rehabilitation process, with one agency reporting that "the new system is far more streamlined, requiring less paperwork, fewer approvals, and less time to effectuate services" (Jackson, 1995, p.13). Changes were achieved in part by upgrading the technology that the counselors use. The system has been automated, eliminating a lot of the paperwork associated with a bureaucracy, and all counselors have a computer on their desk. Each PC is linked to a network, allowing counselors to review job vacancies posted by the state employment commission, conduct job searches on the Internet, and use automated vocational exploration tools (Feinberg, 1997, p. 6).

The Employer

Employers usually make technology decisions based on cost-benefit—one benefit being increased worker productivity. Technology use can be based on recommendations of safety engineers or risk managers, and often it is a direct response to federal mandates, such as Occupational Safety and Health Administration (OSHA) directives, or is a result of injured worker compensation claims. Cost benefits can also be realized in reduction of recruiting and training dollars by returning back to work employees who become disabled.

A number of state agencies have seen the merit in viewing employers as customers. One state reports an increase of 17 percent in job placements between 1995 and 1996 as a result of its new focus on working in partnership with employers (Ruttledge, 1997, p. 22). Key to success is listening to employers' needs and having them quantify specific productivity levels for positions. A good intervention often can be useful for all employees performing in the job, not just the individual with a disability. Larger businesses may have people on staff to assist with technology, but few employers are aware of adaptive equipment. Smaller companies are usually even more limited. Learning employers' tolerances to technology is just as crucial as learning end users' tolerances.

Basic Assumptions

In the Thirteenth Institute on Rehabilitation Issues (IRI) document *Rehabilitation Technology* (Corthell & Thayer, 1986, pp. 5-6), the authors offered seven basic assumptions that still apply today:

1. Rehabilitation technology is better applied by an interdisciplinary team than by any one specialist working in isolation.
2. Anyone can be the catalyst - but the presence of a single coordinated approach is crucial.
3. The final decision and responsibility for the success of an approach rest with the client.*
4. Results obtained will vary proportionally with quality of services obtained and their direct relevance to the needs identified.
5. Development of expertise in rehabilitation technology is an ongoing activity for which adequate human and fiscal resources must be budgeted.
6. The most appropriate use of technology may be a decision not to use it.
7. Clients* relate to, accept and adapt to technological tools based on individual differences having to do with perceived personal benefits and life-styles.

*The work "client" is retained as a direct quote from the IRI document.

Additionally, there are six new assumptions being proposed in this document:

1. The request for technology should *be specific* to address the barriers to employment.
2. For best results, technology needs to be considered and applied *as early as possible*.
3. *Assess* consumers' technology needs and the effectiveness of the technology *in the environment* in which it will be used.
4. Funding considerations should *address immediate and long-term goals*.
5. *Training and follow-up* with the technology is a must.
6. Individuals' needs are periodically changing and the *consideration to use or upgrade* assistive technology should occur periodically also.

The Team

Consumers' success and what they achieve are directly impacted by the assessor's ability to analyze a situation, work with the consumer, and access needed services or technology. Individual choice and joint development of rehabilitation plans are essential to the appropriate provision of both services and technology in public rehabilitation programs. Success hinges on many factors, but none is so crucial as the end users' comfort and acceptance of the rehabilitation technology. "Job accommodations should be done *with* an individual who has a disability, not *for* that individual" (Greenwood, 1990, p. 3).

Another facet of the assessment is the ability to understand and communicate with the employer, who brings a unique perspective to the provision of technology by determining productivity levels and accepting accommodations. Communicating with the employer cannot be ignored.

The rehabilitation professional's comfort with and knowledge about services, including technology, will determine whether available rehabilitation technology and services are used. Advocating that the rehabilitation professional become a technologist is not the intent. However, as a service provider, it is essential that the rehabilitation professional possess knowledge about what technology can do and what questions to ask to determine its usefulness. For example, a specialist in the field of medicine specific to the consumer's needs is often brought in when medical intervention is needed. Yet, when technology is considered, it is not unusual to call the closest, cheapest, or only provider in town. This approach, usually due to a lack of resources, can lead rehabilitation professionals to have a distorted idea of what can be achieved with technology. The end results often hinge on the competency of the service provider, and the old adage "You get what you pay for" applies.

One consideration in the choice of qualified technologists is licensing or certification. The Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) conducts examinations for licensing of certain providers, which is one of the factors indicating a level of competency. Other indicators of competency might be:

- Is the provider a licensed engineer or therapist?
- Does the provider have a background in working with people with disabilities?
- Has the provider had course work in anatomy, physiology, psychology, ergonomics, or medicine?
- What are the provider's rates?
- Will the provider do an initial assessment for a designated fee?
- Are there fabrication (the ability to build) capabilities?
- Is the work warrantied?
- Is a device or product that has been altered warrantied?
- Does the service, if it is equipment, include setup, training, and follow-up?

Service Provider Approaches

Service providers are known by a variety of titles–rehabilitation engineer, technologist, therapist, to name a few–and bring their own biases and approaches to technology assessment. It is understandable that each provider brings a unique philosophy and approach to service delivery, given assistive technology's wide scope and the variety of provider backgrounds. Those characterized as generalists may have some limitations but on the whole provide a multitude of services for a wide segment of consumers. Specialists, on the other hand, may work only with a specific population or confine themselves to specific areas such as seating, augmentative communication, or computer access. Generalists and specialists use a variety of approaches to arrive at technology solutions.

Guerrilla technology. Usually will fabricate, often on site. Will not rely on commercially available equipment, except for componentry.

Soft technology. Will do assessments and present options. When equipment is needed, will focus on what is commercially available. When fabrication is needed, will refer or contract out to other providers.

Show and tell. Will bring a variety of equipment to assess with consumer. Often will not recommend, but will allow consumer to test to determine what works best. May not recommend without seeing in use.

Sale technology. Provided by vendors who are manufacturers or sales representatives of specific equipment. Recommendations may be limited to what they sell.

Techno-luster. No matter what the problem or barrier, a computer or electronic aid is needed; the more bells, whistles, and lights, the better.

Lone Ranger. Rides into town and single-handedly provides assistive technology to overcome any problem and save the day.

Most service providers will be a hybrid of two or more of these characterizations. No one approach is more right or wrong than the other. Better decisions are a result of awareness. The key to success is always outcomes or employment.

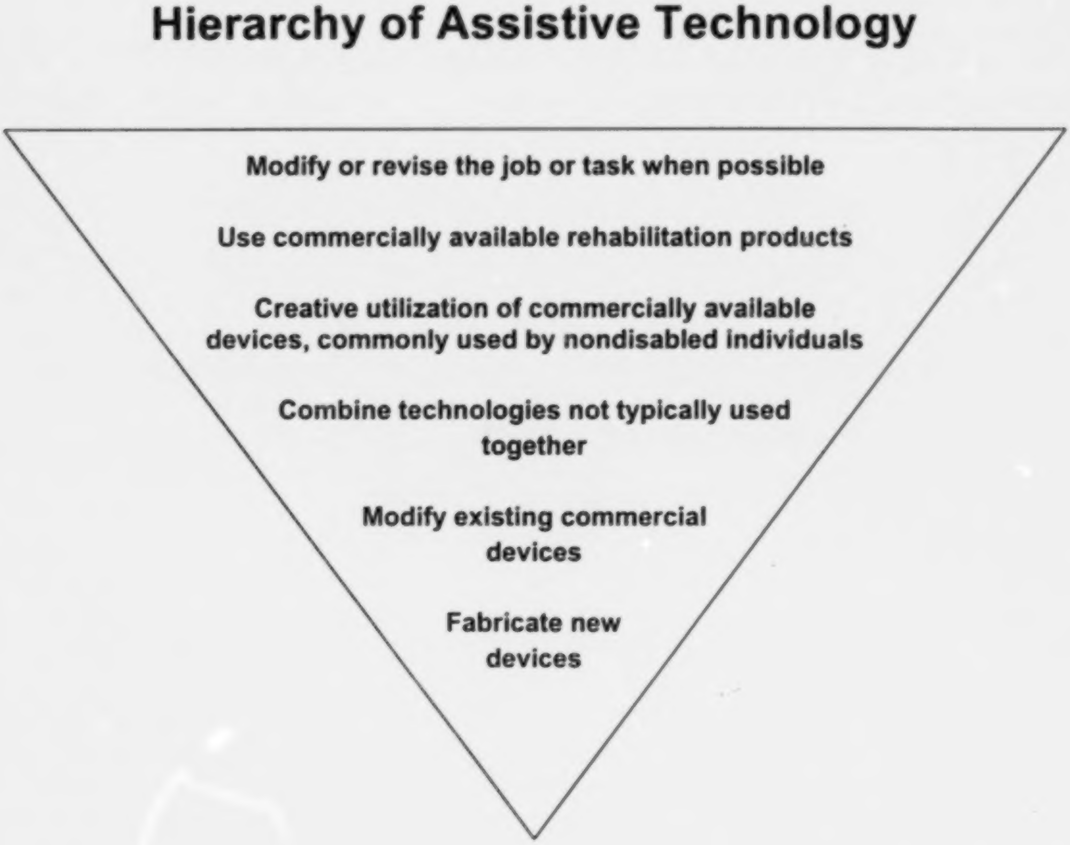
Options for Technology Provision

Assistive technology follows a simple hierarchy (see Figure 1). The starting point is to have correct and complete information and know everyone's expectations, which may require some detective work for the rehabilitation professional and service provider. Solving a consumer's problem quickly is a common goal; however, if done too hastily and without all the facts, the consumer may not benefit from appropriate rehabilitation technology.

The service provider and rehabilitation professional should examine all pertinent information about barriers the consumer faces in preparing for, achieving, or retaining competitive employment. After barriers are identified, methods to maximize the consumer's abilities can be determined. Rehabilitation technology provision is a process consisting of four options in the following progression:

Option I - Compensatory Strategies

The service provider and rehabilitation professional identify and examine all pertinent information about barriers faced by the consumer in preparing for, achieving, or retaining competitive employment. Compensatory strategies to maximize the consumer's abilities are then explored; often there are solutions that don't require any hardware. Examples of compensatory strategies are job restructuring, restructuring work flow, and flex time, to name a few. In one instance, an individual with cerebral palsy, who uses a power chair for mobility, was hired in a clerical position. This individual had good use of the left hand but was having difficulty performing the job duties. A technologist was called in and, after reviewing the situation, recommended a complete reversal of the work station setup and work flow. The previous employee had been righthanded, and by simply reversing setup and work flow, the consumer had full access, improved productivity and was able to be competitive in employment.


Hierarchy of Assistive Technology
Modify or revise the job or task when possible
Use commercially available rehabilitation products
Creative utilization of commercially available devices, commonly used by nondisabled individuals
Combine technologies not typically used together
Modify existing commercial devices
Fabricate new devices

Symons and Ross, 1991

Figure 1

Option II - Off-the-Shelf Technology

Compensatory strategies are not sufficient if a consumer experiences multiple problems. Off-the-shelf technology is then considered, with commercially available equipment sometimes all that might be needed. Rehabilitation professionals should keep two points in mind: off-the-shelf includes all products, not just assistive technology for people with disabilities; and the major problem with off-the-shelf is that it always looks great in the brochure but often is not accessible for the consumer to try out or test drive the technology.

Option III - Modification of Off-the-Shelf Technology

Tweaking or customizing off-the-shelf technology to meet the consumer's specific needs is an option. At this point the questions listed on page 5 become important. Here, also, communication among team members is extremely crucial for success.

Option IV - Customizing

A custom-made device is the last option in the process of providing rehabilitation technology. It is essential to have developed clear understandings and a budget prior to initiating this service. Customizing does not have to be an expensive service, but it has the potential to hit or completely miss the mark in overcoming barriers and become a painful trial and error process if not thoroughly thought out.

It is important to note that practice and training are as critical as identifying the appropriate option and technology. Success rests with the consumer's perception that the intervention enhances skills and abilities, is beneficial, and is worth the effort.

Costs and Benefits

It is often said that the cost of providing assistive technology in the workplace is expensive, and employers are reluctant to absorb those costs. These are misconceptions. The Council of State Administrators for Vocational Rehabilitation's (CSAVR) 1995 survey of vocational rehabilitation agencies found that while budget considerations for technological devices and interventions were identified as common barriers, there appears to be a gradual increase in the willingness of employers to finance job accommodations (p. 5).

The Job Accommodation Network (JAN) website indicates 80 percent of all job accommodations are achieved for under $500. A recent national survey found only 27 percent of companies reporting the average cost of employing a person with a disability is greater than employing a person without a disability, and the median cost per employee for accommodation was $223 (National Organization on Disability, 1995, p. 60). A Sears, Roebuck and Company study determined that 69 percent of accommodations cost nothing, 28 percent cost less than $1,000, and 3 percent cost more than $1,000, with the average accommodations costing $121 (Blank, 1994, p. 34). There are no statistics available to determine whether productivity levels with accommodations in place are comparable to or surpass that of other employees without use of the technology. Often, other employees are provided the same technology, as either a means to boost productivity or to protect them from poorly designed work stations.

Resource Publications

Previous IRI documents on the subject of assistive technology can provide additional information.

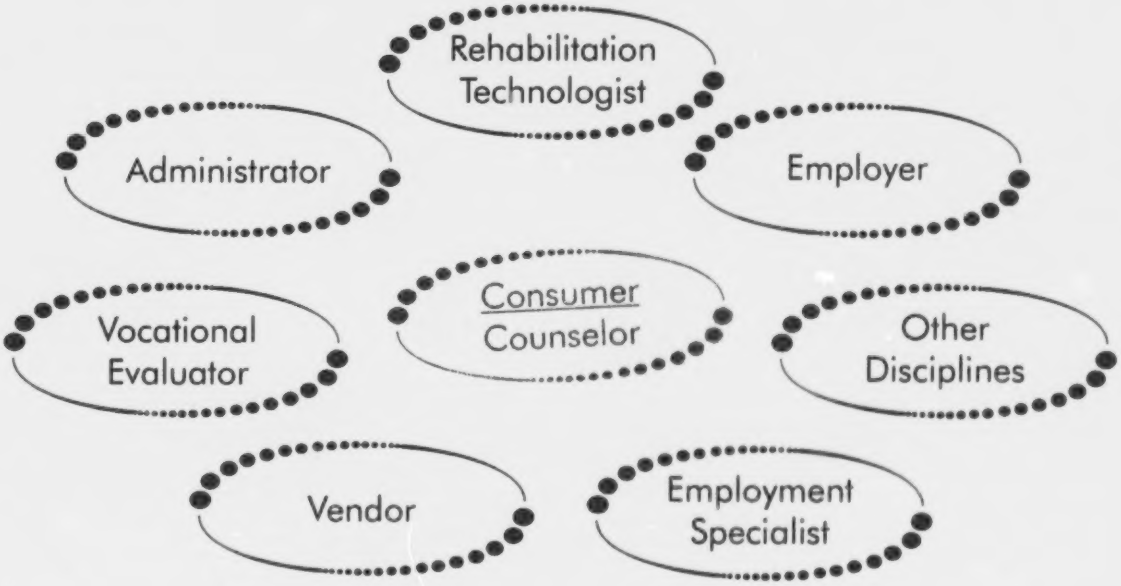
The Provision of Assistive Technology Services in Rehabilitation, Seventeenth, 1990
The Future Workplace: Implications for Rehabilitation, Fourteenth, 1987
Rehabilitation Technologies, Thirteenth, 1986
Computer Assisted Rehabilitation Service Delivery, Eighth, 1981
Rehabilitation Engineering: A Counselor's Guide, Sixth, 1979

The rapid progress in technology dates some of the material, but a review of these documents can be useful and provide a perspective of the evolution of rehabilitation technology. It is anticipated future IRI documents will address this subject due to the constant state of flux in the field of assistive technology.

Chapter Highlights

- Thirteen basic assumptions, six of which are new
- Service provider approaches to technology
- Options for the hierarchy of assistive technology
- Costs and benefits of assistive technology

Chapter II
The Pivotal Role of the Counselor


Rehabilitation Technologist
Administrator
Employer
Vocational Evaluator
Consumer
Counselor
Other Disciplines
Vendor
Employment Specialist

Introduction

This chapter examines the unique and essential role of the counselor in assistive technology acquisition for the purpose of achieving successful, competitive employment outcomes. A study conducted by the South Carolina Rehabilitation Commission (TECH POINTS, 1995, p. 2-2) indicated the counselor is the most significant single element impacting consumer success or failure in acquiring AT for the purpose of vocational rehabilitation. Furthermore, it is the counselor's ability and willingness to recognize the potential of AT to assist the consumer that are most important to its acquisition. *Attitude, awareness,* and *approach*, specific factors that reflect a counselor's willingness to consider AT, are discussed in this chapter. Skills, model programs, and other information useful to the counselor will be reviewed elsewhere in the document.

Attitude

The first and most critical step in providing AT is the willingness of the vocational rehabilitation (VR) counselor to consider assistive technology as a vocational solution. Although AT is not a panacea, it cannot be ignored as a tool for assessment, training, and employment. This is especially true for the consumer with one or more significant functional limitations that affect communication, mobility, motor skills, strength and endurance, self-care, sensory skills (hearing, seeing, tactile), cognition and memory, psychiatric function, and academic achievement.

Assistive technology can greatly increase independence, productivity, and self-confidence, and in so doing, may be the only means by which the consumer can experience success in employment. In considering assistive technology, it is not necessary for the counselor to fulfill a wish list, but it is essential to regard AT as a legitimate option that should be realistically evaluated. It should also be noted that AT can only augment or enhance existing abilities; it will not create them.

As in all good case development, the consumer should be integrally involved in vocational planning. Some consumers may know more about the desired assistive technology than the counselor as their needs are often very individualized, and be adamant about receiving specific devices and/or services. These need not be issues that intimidate, but points on which planning should proceed and responsibility for success shared.

In some cases it may seem that plan development for AT is more burdensome than valuable. There are valid reasons for this, but VR agencies need to work collaboratively to remove these barriers:

Barrier 1. ***Assistive technology can be overwhelming due to the wide range of technologies that need to be investigated.***

Resolution: While it would be helpful for the counselor to become familiar with the range of AT devices and services, it is not necessary to become expert in all of them. However, it is essential for VR agencies to assist counselors in identifying the availability of technical assistance in a wide range of devices and services. Once this has been accomplished, the AT partnerships described throughout this document should be utilized.

Barrier 2. ***Assistive technology can be expensive and create pressure on budgets.***

Resolution: Consumers with significant disabilities may require expensive assistive technology solutions in order to achieve successful employment outcomes. As in all prudent determinations, the decision to authorize AT should be based on the efficacy of the device or service, not cost. Furthermore, consumers with significant disabilities may be eligible for Supplemental Security Income or Social Security Disability Insurance. Once substantial gainful activity is achieved, the VR agency may be reimbursed for some or all of these expenses by the Social Security Administration.

Barrier 3. ***Counselors may lack knowledge of specific devices or technologies.***

Resolution: Counselors can obtain an effective working knowledge of AT by identifying appropriate rehabilitation technology specialists and developing effective partnerships. Vocational rehabilitation agencies should work to obtain in-service AT training to enhance and continually update staff development.

Barrier 4. ***Technical assistance may not be readily available to staff.***

Resolution: Counselors may feel the rehabilitation technology specialist is unable or unwilling to address assistive technology issues from the VR perspective. Agencies should develop an in-house capacity to address these problems in order to be responsive to counselor concerns. Hiring a staff rehabilitation technology specialist, developing a subcontract, or identifying current staff with the ability to share AT knowledge will help mitigate this barrier.

Common Myths About Assistive Technology

There are also myths that affect attitudes and create barriers to provision of assistive technology; these misconceptions need to be addressed and resolved. The most common follow:

Myth 1. ***People with disabilities want the latest, most expensive devices.***

People with disabilities want something that is easy to use, reliable, affordable, and for which maintenance is readily available. They shop with the same criteria as everyone else.

Myth 2. ***Assistive technology is complicated and expensive.***

The majority of AT solutions are simple and inexpensive. It may be as simple as rearranging work space. Complication and expense are not necessarily a part of every AT solution.

Myth 3. ***Assistive technology is the be all and the end all.***

Locating and using the appropriate device will not necessarily solve the problem. Assistive technology can be a powerful tool and make accomplishing a task easier, but it does not end all the difficulties that come with a disability. It is important for both counselor and consumer to understand the device's limitations in addition to its capacities.

Myth 4. ***Assistive technology is a luxury–want versus need.***

Technology for most people makes things easier. Technology for people with disabilities makes things possible. Because a device makes a task easier or more convenient to do does not make it a luxury. Many of today's common devices and appliances were also once seen as luxuries.

Myth 5. ***Assistive technology should be withheld until the consumer demonstrates employability.***

Consumers typically participate in training and take time to acquire skills prior to employment. Withholding technology until the consumer can prove it is necessary for work puts the cart before the horse. Assistive technology may also be necessary for assessment, training, and skill development.

Myth 6. ***All people with similar disabilities have the same assistive technology needs.***

Equipment that has similar functions may not have the exact features needed by other consumers with similar disabilities. It is vital to assess AT needs and equipment features on an individual basis. Up-to-date information regarding a wide variety of technological interventions will facilitate selection of AT that suits the unique needs of the individual.

Myth 7. ***Assistive technology needs are assessed only once.***

Assistive technology needs change as consumer needs change. Job responsibilities may also change, resulting in exploration of new interventions. Ongoing self-assessment and reassessment by rehabilitation technology professionals will promote job advancement and mobility through selection of the appropriate accommodations.

Myth 8. ***The rehabilitation professional always knows best.***

While rehabilitation professionals have access to networks and resources to keep current regarding technical advances, users of AT have every day experience, and that motivation can lead to the discovery of solutions. It is important for rehabilitation professionals and consumers to work together.

Myth 9. ***Vendors always provide the most appropriate assistive technology assessment.***

Vendors can provide valuable information regarding features and functions of their products. However, their goal is to sell a product. It is important to get objective assessment information from rehabilitation technology specialists rather than to rely solely on product descriptions. The vendor is only one member of the team.

Myth 10. ***All assistive technology purchased for the consumer will always/never be fully utilized.***

It is important for consumers to be involved in the decision-making process. Assistive technology that is unacceptable to consumers, for whatever reason, is likely to be abandoned or never used. Issues such as quality of the prescription and peer or workplace acceptance will impact use, which is why it is important to monitor provision of assistive technology and ensure that AT services (training, maintenance, upgrading) are provided.

As a vocational plan is developed and goals are achieved, consumers should be encouraged to become more independent in acquiring assistive technology. When placed in a competitive, career-oriented position, due consideration should be given to current and future AT needs. Consumers should also be educated as to their rights to AT (reasonable accommodation) through the Americans With Disabilities Act (ADA). Support and advice should always be provided by the counselor, but full independence is the ultimate goal.

Awareness

To assist consumers in achieving successful employment outcomes, it is essential that the counselor develop a general awareness of the potential of assistive technology. Today technology plays a greater role in everyone's life and the convenience and efficiency it allows are clear. For the person with severe disabilities, these benefits are multiplied.

Assistive technology awareness begins during the intake interview. If the consumer uses AT, follow-up questions should be asked concerning use of assistive technology for activities in daily living, transportation, recreation, and social activities. Assistive technology used in these areas may translate to use in training or employment. The need for AT will cross boundaries of age or vocational status, as it has become integral to the lifestyle of the individual.

Another indicator to the potential benefit of AT in vocational rehabilitation is the consumer's expressed frustration regarding inability to achieve desired goals. "If only I could drive . . . earn more money . . . finish school/college . . . ." Since AT has the potential for making what appears to be impossible possible, awareness should lead the counselor to consider assistive technology in addressing these issues.

Vocational rehabilitation for older or aging consumers is an emerging area that warrants improved awareness of AT. Some consumers may be persons served in the past whose disabilities have exacerbated, while others acquired disabilities later in life. In either situation, AT can be an effective tool for job retention, since there are fewer new employment opportunities for older workers. Acquisition of computer skills, provision of voice activation software, orthotics, ergonomic workstations, amplified telephones, and modified tools are examples of assistive technology that are beneficial for this population.

TECH POINTS is a system for acquiring awareness of assistive technology in relation to formal case status. Developed by the South Carolina Rehabilitation Commission's Center for Rehabilitation Technology Services, TECH POINTS is described as "a practical, easy-to-follow guide on how to integrate rehabilitation technology (assistive technology)" into vocational rehabilitation. Utilizing a series of critical junctures in the VR process, TECH POINTS provides the rehabilitation professional with strategies to determine if some type of AT should be considered. These seven points coincide with activities that exist in some form in all vocational rehabilitation agencies.

Referral/Application

The initial interview with a consumer is critical to development of the counseling relationship. At this time, impressions regarding job readiness and employability are formed and observations as to the severity of the disability and its impact on vocational planning can be made. It is here that assistive technology should be factored into vocational planning. Assistive technology and reasonable accommodation assessments at intake will be necessary for evaluation, training, and employment. Using the questions below as a guide, a technology needs profile can be prepared:

1. Are there challenges or problems where technology concerns are identified?

2. Is an assistive technology evaluation indicated?

3. If more than one technology is indicated, which is the priority?

4. Will reasonable accommodation be necessary for evaluation? training? employment? job retention/return to work?

Trial Work Experience

For consumers for whom eligibility of services cannot be determined without additional information necessary to make a determination of the employment outcomes, trial work experiences provide the VR counselor an opportunity to determine eligibility and assess the potential for the individual to be able to benefit from VR services in terms of an employment outcome. During this time, assistive technology skills critical to achieving successful employment outcomes can be identified and developed—driving with adaptive automotive equipment, using an augmentative communication device, using modified tools, acquiring the appropriate mode of computer access. Also, the counselor and consumer can collaborate on determining needs for AT and identifying resources for meeting those needs. Assistive technology devices can be tried in work situations ensuring that they are appropriate and meet the needs of the consumer and real job situations.

During the trial work experiences, the individual's abilities, capabilities, and capacity to perform in work situations are assessed periodically, including experiences in which the individual is provided appropriate supports and training. Patterns of work and social behavior are appraised, and services needed for the individual to acquire the occupational skills necessary to perform adequately in a work environment can be identified. Services would include referral for the provision of rehabilitation technology services to assess and develop the capabilities to perform in a work environment.

Trial work experiences can (a) determine eligibility through a determination of the individual's employment outcomes and the specific VR services (including AT) to be included in the Individualized Plan for Employment (IPE) of an eligible individual, and (b) determine the existence of clear and convincing evidence that the individual is incapable of benefitting in terms of an employment outcome from VR services due to the severity of the disability of the individual.

Plan Development

At this point eligibility has been determined, a vocational goal developed, and an IPE prepared. Goals involving assistive technology have been identified and some solutions implemented. It is important at this stage to use information already acquired regarding AT and anticipate its use for achieving reasonable accommodation in planned services. Counseling focus is on orienting the consumer toward expressing reasonable accommodation needs during training or employment interviews. The consumer should also be made aware of cost and care of AT, and counseling should include contingency plans for repair or replacement of AT.

Services

In some cases, the need for assistive technology cannot be anticipated or it becomes necessary due to exacerbation of the disability after the IPE has been developed. If the counseling process has been collaborative, consumer and counselor should determine if a subsequent AT intervention is necessary. An amended plan can now be developed and implemented by providing appropriate assessment for acquiring assistive technology. The consumer should again prepare contingency plans regarding repair or replacement of AT.

Placement/Follow-up

Placement is often the time when a previously unanticipated need for assistive technology becomes apparent. Job analysis and identification of essential functions are helpful in determining these needs and should be considered in all situations where AT is required. Initially, consideration of assistive technology is directed toward general accessibility. The AT applications will become more job specific as placement is realized. Prior to job placement, the counselor should determine if reasonable accommodation is necessary for the job interview, as this intervention may save the consumer uncertainty or embarrassment.

Counselors should be quick to offer an assistive technology consultation or worksite assessment in order to assist in securing the position. Vocational rehabilitation agencies are unique in their ability to provide these services, and their use should be maximized. A discussion of post-employment services and reasonable accommodation provisions of the ADA is also appropriate at this time. The employer and consumer should be reassured that ongoing support will remain available.

Closure

Closure is an important time to review the effectiveness of AT on the outcome of the case for individuals who require assistive technology. Whether or not the outcome was successful, the counselor should consider the impact of AT for future reference. If the outcome was successful, counselors will be more likely to consider assistive technology for future consumers. If the outcome was not successful, valuable information regarding AT evaluation, consumer expectations, and vendor participation will have been acquired.

Observations concerning the impact of assistive technology may also be shared with the employer at this time. Discussion with the consumer and employer regarding reasonable accommodation and opportunity for support through vocational rehabilitation post-employment services may occur at this time. Open dialogue will minimize future difficulties and serve to enhance this essential employer/VR relationship.

Post-employment

By introducing the availability of post-employment services, the counselor can provide reassurance to the consumer and employer. Two situations, in particular, where provision of AT is important are job-in-jeopardy issues and maximization of employment potential. In addition, changes in job description and employment status due to promotion, termination, or the need to perform the jobs of downsized co-workers are inevitable. Provision of assistive technology through post-employment services may facilitate or salvage the employment outcome.

Approach

Although the vocational rehabilitation counselor often acts with autonomy, provision of assistive technology requires collaboration. The role of the consumer as partner has already been cited. For best results, the rehabilitation technology specialist should also be attributed partner status. The goals of the IPE need to be shared with the evaluator or technician in order for the desired device to be prescribed, fabricated, or modified. The counselor should make clear the principles of informed choice, agency purchasing policies, report writing, and recommendations in relation to selection of AT. It should be reiterated that the rehabilitation technology specialist does not represent VR, and no promises or commitments can be made without the counselor's approval.

In return, the rehabilitation technology specialist can help the counselor understand strengths and limitations of a particular device. The counselor should present specific questions regarding the contribution of AT toward achieving the vocational goal, and the rehabilitation technology specialist should provide specific responses to those questions. The counselor can also be assisted by the rehabilitation technologist in determining when to authorize a device or service independently or when to get a formal recommendation.

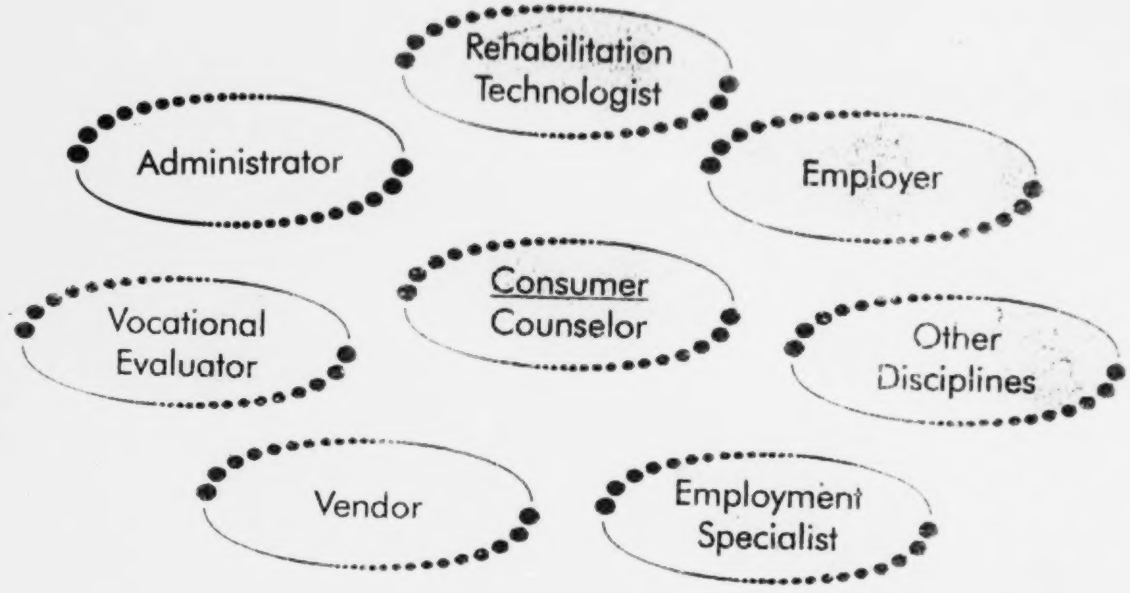
At some point, the training facility, vocational school, college, employment specialist, or employer may join the assistive technology partnership. The availability of respective resources should be shared so the consumer experiences the greatest benefit. Responsibilities of these entities outlined by the ADA warrant negotiation and appropriate compromise, as facilitated by the counselor.

Services that vocational rehabilitation can routinely provide, such as assistive technology evaluations, worksite assessments, and job coaching/orientation, may be offered to support the employer's need to provide devices or building improvements necessary for reasonable accommodation. Successful communication can be established and problems quickly and effectively resolved by using this collaborative approach.

Chapter Highlights

- Four barriers to assistive technology and their resolution
- Ten common myths about assistive technology
- Review of TECH POINTS

Chapter III
The Assistive Technology Team


Rehabilitation Technologist
Administrator
Employer
Consumer
Counselor
Vocational Evaluator
Other Disciplines
Vendor
Employment Specialist

Introduction

As noted in the previous chapter, the counselor plays a pivotal role in the provision of assistive technology. The counselor's ability to develop effective partnerships and engage an appropriate team of rehabilitation professionals in the assistive technology process will result in technological accommodations that meet competitive employment needs. This chapter discusses roles and responsibilities of the team members.

Essential Elements of Successful Teams

- Share a common goal.
- Mutual understanding of roles and responsibilities of team members.
- Appropriately trained team members.
- Availability of necessary resources.
- Feedback for continuous improvement.

Counselor

Currently, the public rehabilitation system places responsibility and accountability for consumer outcomes on the rehabilitation counselor. Consequently, the counselor's attitude, awareness, and approach to assistive technology are crucial to the attainment of competitive employment outcomes. The counselor needs to recognize when assistive technology is appropriate and upon that determination is charged with responsibility for calling upon specific disciplines (rehabilitation technologist, occupational therapist, physical therapist, other) to address needs of the consumer. The counselor must be mindful of the value of assistive technology throughout the rehabilitation process, e.g., referral, eligibility, service delivery, and job placement. Incorporation of appropriate AT ensures that maximum benefit is derived from each phase of the rehabilitation process. The counselor facilitates communication among the consumer, rehabilitation technologist, placement specialist, employer, and any other person who may play a role in the assistive technology process.

Counselor Responsibilities

- Ensure availability of assistive technology for consumer participation in referral process.
- Consult with rehabilitation technologist when assistive technology may be appropriately engaged in determining eligibility.
- Provide rehabilitation technologist with necessary background information about consumer.

Counselor Responsibilities (continued)

- Solicit from consumer specific limitations that technology may overcome.
- Evaluate existing technology used by consumer.
- Consult with rehabilitation technologist when consumer presents functional limitations, so technological possibilities are considered at time of IPE.
- Make clear to team members goals that have been established with consumer, time frames for meeting those goals, and role of each party in meeting them.
- Attend technology assessment with consumer and technologist to assist in formulation of appropriate recommendations.
- Review with consumer all policies or procedures regarding provision of technology services.
- Discuss with person receiving services the assignment of responsibility for ongoing maintenance of the AT provided.
- Arrange for purchase of the technology in compliance with all agency or state regulations that affect purchase of equipment.
- Coordinate delivery, setup and training of the technology with vendor, rehabilitation technologist, employment specialist, and employer.
- Consult employer to determine if technology is accomplishing stated task.
- Use customer service principles in obtaining information. How does consumer feel about services? Does the technology meet expectations? Are there suggestions for improvement?
- Conduct long-term follow-up to assure technology is functioning as expected.
- Follow up with consumer and vendor to ensure that proper installation and training have been completed prior to payment.

Consumer

The consumer is at the center of the assistive technology process. Efforts of other team members are directed toward equipping the consumer with the technology needed to accomplish job-related tasks. As both recipient of the service-delivery process and team member, the consumer has roles and responsibilities in the AT team effort.

Consumer Responsibilities

- Inform team of current technology and indicate its effectiveness.
- Understand scope of rehabilitation program and available services.
- Understand scope of assistive technology services available.
- Communicate clearly and honestly with the counselor and other professionals regarding needs and how they may best be met.
- Become an active partner in solving challenges presented.
- Understand counselor's expectations.
- Understand employer's expectations.
- Share all information pertinent to implementing services with the counselor and other rehabilitation professionals.
- Share concerns honestly with counselor about implementation of technology services and/or devices received.
- Contact counselor if problems develop with technology provided.
- Inform employer that active steps are being taken to correct technological problems.
- Maintain and use assistive technology in accordance with the manufacturer's recommendations.

Rehabilitation Technologist

The rehabilitation technologist's role is to assess and make recommendations for appropriate technology needed to accomplish the required task. The rehabilitation technologist brings to the team a body of knowledge and expertise that usually none of the other members possess. The rehabilitation technologist can be expected to be proactive in soliciting information about consumers, their limitations and goals, and information about employer expectations. The rehabilitation technologist needs to understand both the consumer's specific functional limitations and the required job tasks in order to provide the basis for recommendations enabling the consumer to perform essential job functions. Rehabilitation technologists should engage in only those services that are within their scope of competence.

Rehabilitation Technologist Responsibilities

- Understand referral and intake procedures of the agency.
- Understand the counselor's role and their obligations to consumer and agency.
- Be available to the counselor to address concerns from referral source.
- Work with counselors to determine if specific technology or information would be helpful in enhancing referrals.
- Understand criteria that must be met for eligibility.
- Understand it is the counselor's job to establish eligibility, and the technologist's role to support the counselor, along with other team members, in offering information that relates to eligibility criteria.
- Understand counselor expectations.
- Understand expectations of the person receiving services.
- Understand policies and procedures that guide service delivery for the agency during evaluation to determine eligibility.
- Support the vocational evaluator and other rehabilitation professionals conducting evaluation, e.g., job coach, work adjustment specialist, psychologist.

Rehabilitation Technologist Responsibilities (continued)

- Consider all technology that facilitates evaluation and allows full participation of consumer in the evaluation process.
- Explain clearly and specifically why and how technology is being considered when communicating with consumer.
- Recognize the counselor as primary communicator and decision maker; all recommendations for technology must be communicated to the counselor.
- Understand IPE, informed choice, and consumer and counselor involvement.
- Know what counselor and consumer expect from the technologist in meeting agreed upon goals and plan of services.
- Explain the technology processes, time frames, and options that assist in establishing a plan for services.
- Use referral to assistive technology as an opportunity to educate the counselor on value of assistive technology services.
- Discuss with the counselor and the person receiving services any additional technology issues that may be beneficial.
- Agree on course of action and prioritize services, if several are required.
- Obtain all information about employment goals and objectives for consumer; review technology policies regarding provision of services to the consumer.
- Identify all time frames that impact use and implementation of technology.
- Identify major players in developing a team to make technology recommendations, e.g., consumer, rehabilitation professionals, caretakers, counselors, and vendors.
- Obtain all essential job functions information from counselor, employer, or employment specialist. All technology solutions considered should reflect back to vocational goals as identified on IPE and communicated with counselor.

Rehabilitation Technologist Responsibilities (continued)

- Follow up with counselor to determine how consumer felt about technology service delivery process.
- Follow up with vendor and consumer to ensure proper installation and use of assistive technology.
- Use customer service principles in communicating with team members to obtain information on effectiveness of technology recommendations and service delivery process.

Employer

The employer should be viewed as an equal and critical partner in the technology and rehabilitation process. The employer provides a single element that the rehabilitation agency cannot, and that is employment. The employer's role is to provide the employment opportunity, which results in a successful outcome of the rehabilitation process.

Employer Responsibilities

- Clearly define the job, specific tasks, and all relevant information about the employment opportunity to rehabilitation professionals.
- Present the work environment to rehabilitation professionals.
- Communicate anticipated changes in the work environment so accommodations have future compatibility.
- Solicit input from rehabilitation professionals for training job site employees in the skills necessary to work effectively with persons with disabilities, e.g., approaching and working with a blind person or basic communication skills with a deaf person.
- Comply with the Americans With Disabilities Act.
- Communicate with rehabilitation professionals about financial or other hardships imposed by providing accommodations and strategies for resolution of those issues.

Employer Responsibilities (continued)

- Contact rehabilitation professionals if problems occur on job, the accommodations do not appear to be effective, or essential job tasks change that require additional accommodations.

Employment Specialists

The role of the employment specialist is to market vocational rehabilitation services to employers, which will result in employment opportunities for persons with disabilities. The marketing effort involves educating employers about the range of services provided by the vocational rehabilitation program and ADA. Equally important, the employment specialist needs to educate rehabilitation professionals regarding needs and concerns of employers.

Employment Specialist Responsibilities

- Advise counselor and consumer of employment opportunities and job openings.
- Provide counselor and consumer with job description and essential functions of specific job.
- Coordinate contact among counselor, consumer, and employer.
- Explain role of assistive technology to employer.
- Coordinate on-site assistive technology evaluation with employer.
- Coordinate delivery and setup of assistive technology with counselor, rehabilitation technologist, and vendor.
- Offer follow-up services to employer to ensure consumer is successful on the job and the technology functions as it should.

Vendor

The role of the vendor is to provide assistive technology in accordance with recommendations of the rehabilitation professionals. Communication between vendor and team members is essential to ensure the equipment is set up properly.

Vendor Responsibilities

- Deliver equipment in compliance with recommendations of rehabilitation professionals.
- Adhere to professional ethics; ensure no inappropriate or unnecessary equipment is provided.
- Coordinate delivery of equipment to the evaluation/work site with the counselor, and the rehabilitation technologist.
- Ensure equipment is functioning properly after set up.
- Inform the rehabilitation counselor or the technologist if delay is anticipated in delivery of equipment.
- Specify terms and conditions of expected payment to the person receiving the services and the counselor.
- Inform the person receiving the services and the counselor of all applicable equipment warranties and guarantees.
- Provide maintenance services in accordance with terms of warranty.
- Provide replacement or loaner technology promptly if installed equipment is not functioning properly.

Vocational Evaluator

The role of the vocational evaluator is to conduct assessment services that determine vocational potential of the individual. The challenge for the evaluator is to use assistive technology to modify assessment activities, ensuring skills are being appropriately measured. Modification of assessment activities through the use of assistive technology provides a true picture of the consumer's potential as opposed to limitations imposed by the disability.

Vocational Evaluator Responsibilities

- Review request for evaluation from rehabilitation technologist or counselor.
- Consult with rehabilitation technologist to determine if evaluation activities might be modified to gain greater validity.
- Modify evaluation activities on recommendations of rehabilitation technologist.
- Document modification of test or work sample to meet consumer needs.
- Communicate to consumer what will take place during the evaluation process.
- Suggest possible AT approaches for recommended jobs.
- Complete evaluation and forward appropriate report to counselor.

Other Disciplines

Provision of rehabilitation technology may involve other disciplines typically found in the rehabilitation process. Examples of these are occupational therapists, physical therapists, audiologists, augmentative communication specialists, orientation and mobility specialists. Their role is to provide services (information, training, or devices) that may reduce functional limitations and remove barriers to employment for the consumer. Although the disciplines may differ in the area of expertise, responsibilities for each are similar.

Other Disciplines' Responsibilities

- Obtain reason for consultation request from the counselor or rehabilitation technologist.
- Solicit information about consumer's disability, rehabilitation plan, and employment goals from the person receiving the services and the counselor.
- Review request and consumer information; provide feedback to consumer and counselor regarding any specific request that is beyond their professional qualifications.

Other Disciplines' Responsibilities (continued)

- Describe to consumer what will take place in the evaluation or training situation.
- Perform evaluation or training; provide a report to counselor on a timely basis.
- Provide progress reports if evaluation or training is taking place over an extended period of time.
- Provide necessary follow-up services.

Training and Knowledge

Most rehabilitation professionals' knowledge about assistive technology is limited in comparison to their knowledge of other areas in the rehabilitation process. Consequently, if employer demands are to be met, agencies must look for innovative ways to increase AT expertise. Staff in-service training is one obvious solution. In addition, a significant number of excellent assistive technology conferences are conducted annually throughout the nation.

The variety of accommodations available for various disabilities prevents anyone from becoming an expert in all areas. A state often has a limited number of rehabilitation technologists, putting them in great demand. Two methods of addressing the shortage are cross-training and use of the Internet. Cross-training will not produce a technologist who is expert in all areas, but it will provide enough training to broaden knowledge for most routine technology-related questions. The Internet as a resource is discussed in Chapter VIII.

Factors to Consider When Choosing a Technologist

- Certification; ideally, choose individual with the highest level of certification available.
- Expertise to address consumer need.
- Creative and resourceful, with unique approaches to problem solution.

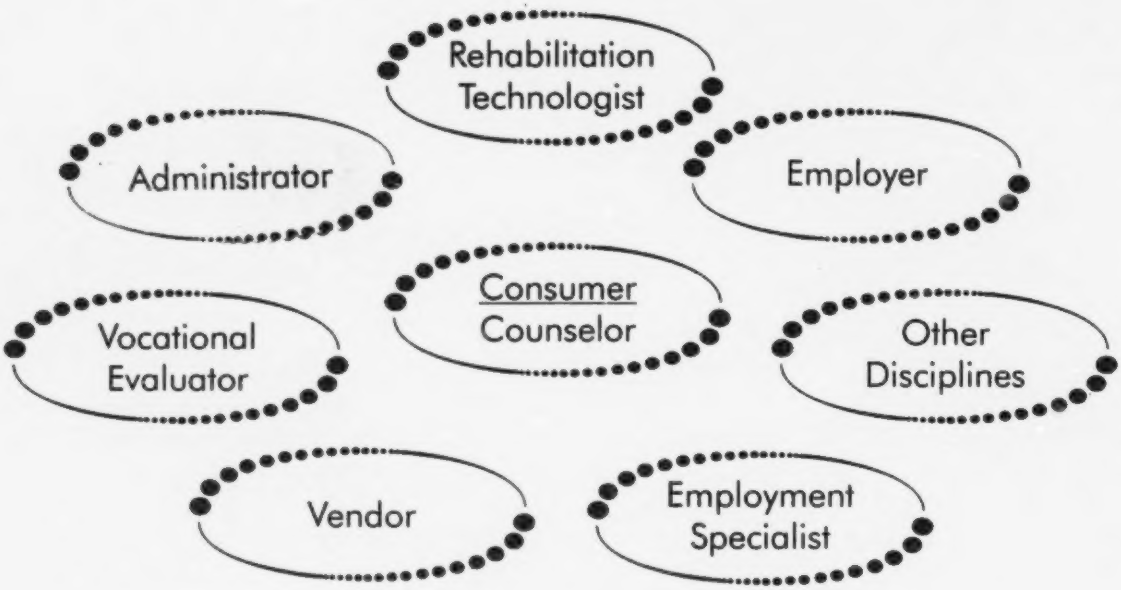
Factors to Consider When Choosing a Technologist (continued)

- Ability to communicate clearly with assistive technology team members, most importantly the consumer.
- Independent; recommendations will not be influenced by preference for a specific vendor.
- Understands mission and goals of public rehabilitation programs.
- Ability and resources to perform suggested modifications.
- A technologist who is part of a team of technologists often brings more resources to the situation than one who works alone.

Chapter Highlights

- **Assistive technology team composition**
- **Roles and responsibilities of AT team members**
- **Factors in choosing a technologist**

Chapter IV
Administrative Challenges


Rehabilitation Technologist
Administrator
Employer
Consumer
Counselor
Vocational Evaluator
Other Disciplines
Vendor
Employment Specialist

Introduction

Administrators' attitude(s), awareness, and approach(es) influence successful provision of assistive technology. This chapter presents administrative challenges to directors, commissioners, other administrative staff, and field services directors in terms of rehabilitation technology and the provision of AT. Items are provided for administrators to review to gauge the effectiveness of AT services and success in meeting the goal of increasing quality competitive employment outcomes for persons with disabilities within an agency.

Vocational rehabilitation professionals realize the state VR program serves more than just one customer. This chapter outlines how administrators can modify their current methods of providing AT in order to meet the challenge of improving services to employers and to consumers–two groups viewed as among the primary customers of a VR agency. In addition, it will discuss ways administrators can support strong partnerships among the counselor, rehabilitation technologist, and consumer to foster an effective AT team capable of determining the best means of meeting assistive technology needs of VR program consumers.

Charge to Administrators

Achieving successful employment outcomes with the use of assistive technology calls for administrators to:

Listen, listen, listen

- To consumers
- To counselors
- To employers

Take necessary action

- Action 1. Acknowledge counselor's concerns
- Action 2. Create an agency culture that is open to AT
- Action 3. Question traditional VR methods
- Action 4. Know the "rights" of purchasing
- Action 5. Create a model AT system

Measure reaction

- Gather feedback
- Improve application of AT

Listen, Listen, Listen

Vocational rehabilitation agencies must routinely assess customer satisfaction to ensure that services provided are consumer-responsive and consumers can make informed choices about the kinds of services they receive and the vendors who provide them.

Gathering feedback from the agency's customers is also a critical element in determining the level of satisfaction with the agency's provision of specific assistive technology services. By analyzing this information, alert administrators will be able to assess strengths and weaknesses in their agency's current AT service delivery. Administrators will then be able to take specific actions aimed at achieving successful employment outcomes with the provision of assistive technology.

Listen to Consumers

Questions to ask consumers about assistive technology:

- How did the vendor treat you?
- Does the service fit your need?
- Was the service provided in a timely manner?
- Is the device durable?
- How effectively did members of the AT team work together in delivering the service?
- Did the team gather all necessary information concerning your disability to make appropriate decisions about your need for AT?
- After placement, did the team adequately consider AT accommodations that could help you to retain or advance in your job?

Listen to the Counselor

Administrators must be willing to have frank discussions with counselors about barriers counselors see to providing assistive technology. Regardless if these barriers are real or perceived, it is important that administrators listen to what counselors have to say, because counselors–as members of the AT team–have first-hand knowledge of the true effectiveness of the agency's AT services. Also, counselors are instrumental in ensuring that AT services are delivered in a manner that satisfies consumers and employers (as customers of the agency) when they work in tandem with rehabilitation technologists and other members of the AT team.

Counselors may be reluctant to voice their concerns directly to an administrator. Therefore, the following list of frustrations often expressed by counselors concerning assistive technology has been compiled from several sources, including an Open Town Meeting held during a national conference on AT (Phillips, 1992).

Common Counselor Frustrations with Assistive Technology

Administrators may ask how these frustrations can be addressed by their agency:

- Broad range of technologies is overwhelming.
- Expensive AT can strain limited budgets.
- Inadequate knowledge about specific AT applications.
- Lack of available technical support or rehabilitation technologists to provide follow-up after AT has been provided.
- Lack of empowerment to make decisions.
- Fear of being overruled by supervisors.
- Other demands on time pre-empt the time it takes to become expert in AT.
- Effect of AT on employability not clearly understood.
- Difficulties in locating resource information about specific AT devices and services.
- Lack of quality vendors in rural areas.
- Lack of funding to update outdated AT.
- Lengthy delays in receiving equipment.
- Additional paperwork requirements.
- Inefficient procurement procedures.
- Fear of inability to balance funding between recommendations made for AT with the need to reach vocational goals.
- Lack of counselor access to AT to perform their jobs compared to rehabilitation technologists' recommendations for consumers.
- Case closures involving AT take additional time.

Listen to Employers

Questions to ask employers about assistive technology:

- What can this agency do to provide AT services for employees with disabilities that could improve overall service delivery?
- How can we support your efforts to accommodate employees with disabilities?
- How has AT helped your business to hire or retain employees with disabilities?
- Do you have any needs for AT that are not currently being met?

Take Necessary Action

The following actions delineate what an administrator can do to strengthen the agency's service component:

Action 1: Acknowledge Counselors' Concerns

It is only natural that counselors may question the value of assistive technology. Perhaps they haven't been exposed enough to technology on *their* job to be fully aware of the benefits of AT. Or maybe they're focused on the challenges to finding employment for individuals with significant disabilities–challenges that don't appear to have easy remedies because they haven't done a thorough assessment of the need for AT.

Action 2: Create an Agency Culture That is Open to AT

Vocational rehabilitation agencies that allow counselors to "do what they've always done," without adequate regard to AT, may be fostering an environment in which counselors dwell on what individuals with disabilities *cannot* do instead of what they *can* do.

Action 3: Question Traditional Vocational Rehabilitation Methods

By encouraging counselors to ask themselves about individual situations that may be helped with AT, savvy administrators can guide counselors to problem-solve overcoming barriers that may limit employment options.

Galvin and Langton (1998) suggest questions that help counselors explore what individuals are currently *able* to do and what these individuals *could be capable of doing* if AT services were provided.

- What if a person needs to communicate in a manner other than speaking?
- What if head movement is the most reliable motor control?
- What if an inability to lift more than five pounds seems to eliminate almost all jobs with physical demands?
- What if a person needs an alternative to standard telephone communication?
- What if recurring carpal tunnel problems have caused an administrative assistant to face possible job transfer or disability layoff? (p. 20)

Action 4: Know the Rights of Purchasing

If assistive technology services are going to be effective, administrators must make sure their agency has user friendly procedures for purchasing services–especially AT services–so counselors can buy the *right* quality in the *right* quantity at the *right* time from the *right* supplier in an effective manner.

Questions counselors may ask to ensure they are purchasing AT in the right quality, in the right quantity, at the right time, in the right place, from the right supplier, at the right price:

- To buy the *right quality,* ask . . .

  What are the specifications? Is it a good value? How will it be used by the consumer? Is it durable?

- To buy the *right quantity* at the *right time,* ask . . .

  Does the vendor maintain an adequate supply of the AT device? Is the delivery schedule convenient? Would delay in receiving the device jeopardize the consumer's job opportunity? Would early delivery of AT assist consumer in assessment or training?

- To buy from the *right supplier,* ask . . .

  What are the vendor's qualifications? Has their past performance been satisfactory?

- To buy in an *effective manner* includes buying at the *right price,* ask . . .

Is there competition among vendors to ensure a good purchase price? What is the vendor's policy on service after the sale? Are procurement procedures flexible to accommodate counselors and consumers? Is there an alternative product that's mass produced for the general public that can be adapted for individuals with disabilities? (National Institute of Governmental Purchasing, Inc., 1993)

Action 5: Create a Model Assistive Technology System

These actions have a proven track record in improving assistive technology service delivery and ensuring all members of the AT team will have their needs and frustrations addressed:

- Collaborate with other entities interested in assistive technology.
- Include AT in all comprehensive staff development and training plans.
- Develop procedures for funding AT.
- Plan for updating or replacing outdated assistive technology for acquiring or maintaining competitive employment.
- Be specific about AT responsibilities assigned to staff.
- Seek other VR agencies' advice about what works to enhance their AT service delivery.
- Seek ways to streamline the provision of assistive technology services.
- Support and encourage the partnership approach of service delivery by all members of the AT team.
- Allow flexibility when trying new methods of AT service delivery.
- Grant counselors the authority to purchase AT with minimal paperwork requirements.
- Foster organizational changes that will best respond to the needs of persons with disabilities by involving consumers and their advocates in all stages of assistive technology service delivery.

- Stay alert to job market changes so individuals successfully rehabilitated are placed with the necessary on-the-job accommodations that will allow them to achieve longevity on the job and advance in their careers.

- Advocate for a state procurement process that facilitates the purchase of AT.

- Develop an internal tracking system for cost accountability on AT devices and services.

Measure Reaction

Survey consumers and members of the AT team again *after* AT services have been provided to learn:

- What they think about the quality of the AT services received.

- What other AT needs should be addressed.

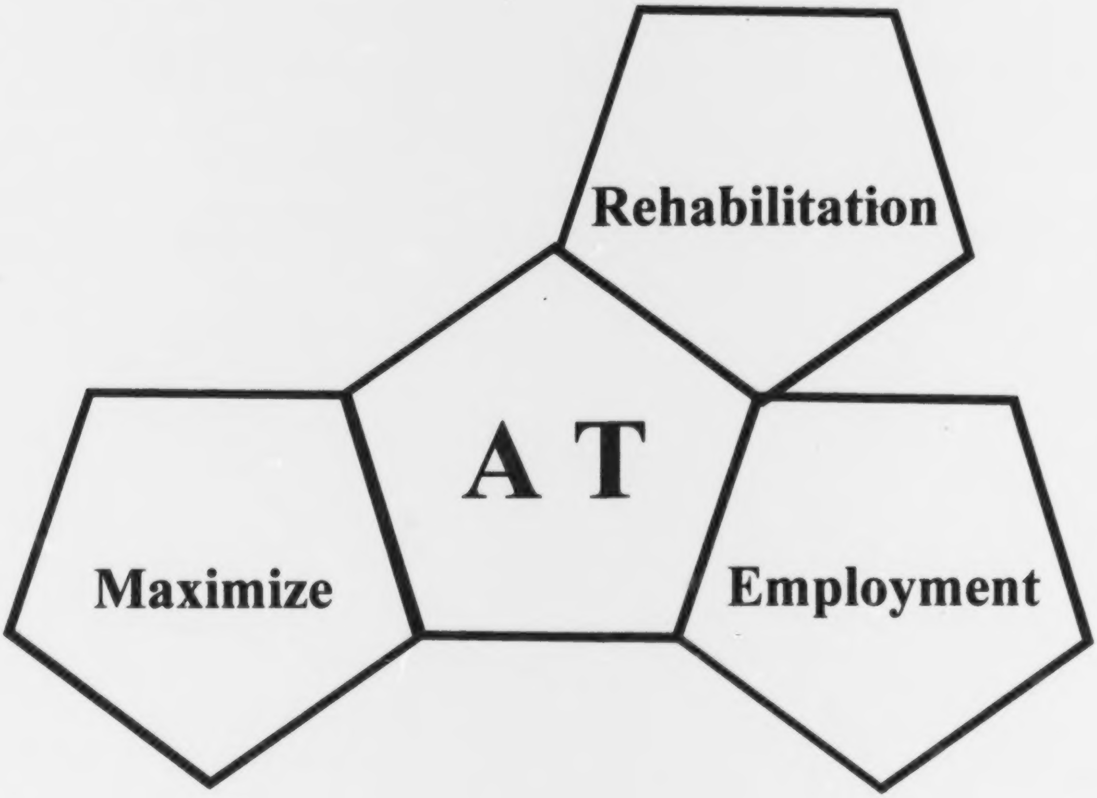
- Their level of satisfaction with the assistive technology.

Considering the scope and speed of changes occurring in rehabilitation technology, there are many opportunities for administrators who play by new rules and take personal responsibility for their agency to provide the highest quality assistive technology services. Anticipating the needs of vocational rehabilitation consumers and improving the application of AT for the individual will do the most to achieve successful employment outcomes for persons with disabilities.

Chapter Highlights

- Gathering feedback
- Administrator's actions
- Creating a model AT system

Chapter V
Application of Assistive Technology for the Consumer



Introduction

Assistive technology options range from modifications in the way a task is performed to the use of medical technologies that improve a person's function. An assistive technology solution may involve the use of specialized, high technology equipment or require only common off-the-shelf marketplace items available to everyone, which include ergonomic furniture and equipment, powerful computers, telecommuting tools, and mainstream software products.

Categories of AT within the rehabilitation process are described in this chapter. Its goal is to provide the counselor with a structured approach in the evaluation of consumer needs and selection of AT.

The Assistive Technology Process

The counselor must understand the process involved in delivering assistive technology to assure successful application of AT for the consumer. Selection and critical aspects of service delivery are addressed in the following process.

Assessment

Assessment is the process of evaluating an individual's abilities in the context of the requirements of their goal requirements. In assessment, abilities, currently used compensatory strategies, and equipment tryouts are discussed, with the emphasis on abilities, not disabilities.

Selection

The selection process involves exploring available options to find the most appropriate means to achieve consumer goals. The team should consider both low and high technology, as well as a combination of different technology forms. Communication with all team members is needed for the consumer to select the most effective option.

Purchase/Modify/Fabricate

Once the selection has been made, the next step is the acquisition of necessary equipment. If possible, off-the-shelf items should be purchased. At times it may be necessary to modify purchased equipment or, in some cases, to fabricate equipment from scratch.

Implementation

This is perhaps the most critical step in determining the success of an application of assistive technology. The counselor should ensure that necessary arrangements are made for implementing the accommodation. Failure to do so will most likely result in technology abandonment. Activities to be considered at this time include setting up of equipment in the consumer's environment, carrying out recommended adjustments, training in its use, and allowing a period of time for the consumer to become skilled in the use of AT. The employer should be consulted on all worksite accommodations to assure that job demands are satisfactorily met.

Follow-Up

The objectives of follow-up are to ensure that problems do not occur after the accommodation is implemented and the consumer is receiving full benefit of the technology. If problems are found, they must be resolved. It may be necessary to make minor adjustments or fine-tune the accommodation. If application is at an employment site, the employer's satisfaction with the accommodation should be addressed at this time.

The following figure provides a method of examining the many forms of assistive technology that are available to the consumer to enhance their rehabilitation.

Applications of Assistive Technology for the Consumer

Technology applications to maximize function in **preparation** for vocational rehabilitation and employment *

- Augmentative & alternative communication
- Aids to daily living
- Environmental control units
- Home modifications
- Orthotics
- Prosthetics
- Seating/Positioning
- Transportation/vehicle modification
- Wheelchairs/mobility
- Vision and hearing aids

Technology applications in the vocational rehabilitation **process** and employment

- Job site accommodations:
  - low tech solutions
  - ergonomics
  - employer concerns
- Computer access:
  - input devices/options
  - output alternatives
  - computer as a tool

Figure 2

*The provision of AT in preparation for vocational rehabilitation may be the responsibility of independent living, special education, or some other program not affiliated with the public VR program.

Technology Applications to Maximize Function in Preparation for Vocational Rehabilitation and Employment

The means to perform the basic activities of daily living must be in place before an individual considers starting work or school. Wherever appropriate, the categories of assistive technology listed below should be employed to minimize obstacles and maximize function in preparation for the rehabilitation plan and employment.

Augmentative and alternative communication (AAC) is technology that assists an individual who is either unable to speak or whose speech is very difficult for others to understand. It may involve use of a letter or picture communication board or an electronic communication device that provides synthesized speech output.

Aids to daily living (ADL) are generally low-tech, self-help tools that provide assistance in activities of daily life such as preparing food, eating, dressing, bathing, personal hygiene, and home maintenance.

Environmental control units (ECU) enable an individual with limited mobility to control household appliances and equipment. A low-end ECU system may be used to turn lights and switches on and off, whereas a more sophisticated system can be used to operate the TV, VCR, and other electronic equipment.

Home modifications are adaptations and additions that reduce or eliminate physical barriers in the home; examples are ramps, offset hinges, and grab-bars.

Orthotics now refers to any device that augments human function. Originally the term was used for devices such as splints or braces that augment the function of a body part.

Prosthetics are devices that replace human function. The term is used both for devices that provide a structural support, and those that provide a functional replacement.

Seating and positioning involves accommodation to a wheelchair or other seating system to provide greater body stability, more functional upright posture, and a reduction of pressure on the skin surface to reduce risk of skin problems.

Transportation/vehicle modifications to a car or van may include a wheelchair lift or wheelchair carrier, hand controls, or other adaptive driving aids.

Wheelchairs (manual and electric), scooters, and walking devices increase the independent activity of individuals with mobility disabilities.

Vision aids are reading aids, mobility aids, voice synthesis computers, and household aids available for persons with vision impairment. These aids include magnifiers; canes; Braille labels; Braille notetakers; voice output computers; and audio clocks, watches, and alarms.

Hearing aids for individuals with hearing impairment include conventional hearing aids, assistive listening devices, visual or vibrating alerting systems, TTY, amplified telephones, real time captioning, and remote interpreting services.

Technology Applications in the Vocational Rehabilitation Process and Employment

The ultimate goal of the vocational rehabilitation process is employment. Assistive technology is a powerful tool for opening doors that lead to employability. As an individual moves closer to the goal of employment, the accommodation process becomes more task specific, with implemented solutions less likely to impact the consumer's overall function and more likely to address specific barriers faced in training and on the job.

The following technology applications first examine the low-tech and process-oriented accommodations made at the worksite, then look at the role the computer can play in the rehabilitation process and employment.

Jobsite Accommodations

Worksite accommodation is the area of assistive technology that allows for the broadest range of options and considerations. Solutions at the worksite often combine various forms of assistive technology to overcome barriers to a variety of tasks.

Low-tech solutions. Everyone performs accommodations on the work environment to make it more comfortable or effective. These include scheduling work activities for the time of day when most effective at performing them, raising or lowering a chair, choosing user friendly software, reordering tasks, sharing tasks with other workers, relocating work to areas where a more favorable environment exists, and other organizational changes.

The physical environment can be altered to better fit the needs of a person or specific task. Physical accommodations can be alterations of existing tools, purchase of alternative tools, purchase of specialized furniture, building accommodations, and other specialized services.

Additional low-tech solutions are telephone adaptations (large button, headsets, hearing aid compatibility, amplification), tactile devices, and visual cuing devices.

Ergonomics. Ergonomics is the science that examines the interface between people and their workplace. When ergonomic principles are applied to the overall workplace, increases in productivity can be expected for all workers. Ergonomic solutions often result in physical changes to the workstation and may include adjustable keyboard trays, adjustable ergonomic chairs, special tools, task lighting, and alternative grips and handles.

Employer concerns. Accommodations at the workplace occur at the discretion of the employer. Therefore, it is critical that the employer is a partner in the AT team and is involved in the process from beginning to end.

Rehabilitation professionals must be prepared to address the common concerns of employers in order for the accommodation process to proceed smoothly:

- Other workers may feel the person with a disability has an easier job.
- There are safety risks associated with the workplace accommodation.
- Worker's compensation or other insurance costs will rise.
- Other workers will want the accommodation as well.
- The accommodation is too costly or not reasonable.
- The job will not be done satisfactorily.
- Concerns regarding outsiders performing the accommodations.

The rehabilitation professional should counteract these concerns by directly addressing them with appropriate factual responses to remove myths, biases, or misconceptions. Gains in productivity and safety in transferring accommodations to other workers can be offered as a potential benefit to the employer and all employees. Most importantly, the employer must be kept informed and involved.

It was reported in the Rocky Mountain News (1997) that failure to make rather inexpensive accommodations can cost more in the long run for the employer if an employee with a disability takes action under the ADA. In a well-reported case in rural Colorado, a highly-qualified instructor was denied a job opportunity because the school refused to install a concrete ramp that was estimated to cost only $300. The instructor took the matter to court, and the jury awarded him $70,000 in lost pay and damages.

> **Case Study:** Mary was a recent graduate of a technical college program in clerical functions. As a result of a childhood accident, one of Mary's arms had been amputated. Her other arm had also been injured and demonstrated limited range of motion and limited grip strength and control of her hand.
>
> During her training, Mary was provided assistance in selecting and purchasing a voice

activated computer and a vehicle that would maximize her function and control. When she accepted a position as ward clerk in a large medical clinic, she was confronted with more task-specific barriers. Her need to interact with a computer was limited to a menu-driven system that required cursor control. To provide this cursor control, a commercially available foot mouse was provided.

Part of Mary's job required her to extensively handle three-ring binders. Pulling these off a shelf presented a problem. To provide a better gripping mechanism, cords were run around the spines of the folders. In addition, it was difficult for Mary to pull files from a standard vertical file, so low profile wire handles were threaded into the tops of the files making them easier to handle.

The position also required her to slide papers into plastic sheet holders. In order to accomplish this task, a process was developed whereby she folded a corner of the paper to assist in the insertion process. Once the sheet was in the holder, she could straighten it out. Mary was also provided with a headset phone so that she wouldn't have to use her hand to hold the phone to her ear. The doors on the rooms she needed access to were fitted with lever door handles.

A more difficult problem was encountered with a vacuum tube system used to move hard copy material between offices. It was necessary to simultaneously press a spring-loaded catch at both ends of the tube in order to open them. Mary was not able to perform this task and there was not a readily available solution to the problem.

One of the plastic tubes used in Mary's workplace was given to the rehabilitation technologist. A small piece of plastic was machined into a jig that would hold one end open while the catch at the other end was unlatched manually, allowing Mary to operate the vacuum tube system and successfully perform her job.

This job accommodation case study demonstrates how the combination of a number of low tech solutions resolved significant barriers at an employment site.

Computer Access

In 1991, companies spent more money on computing and communications gear than the combined monies spent on industrial, mining, farm, and construction equipment (Pritchett, 1994). Most workers today have some interaction with computers in their place of employment. Persons with disabilities may find the computer to be the ideal tool for overcoming barriers in employment.

A study, published in *Spine* (Kruse, Krueger, & Drastal, 1996), examining factors that led to successful employment for individuals with spinal cord injuries, found computer proficiency to be most strongly associated with earning a competitive salary. In fact, the research indicates there is virtually no pay differential between computer users with spinal cord injuries and nondisabled computer users.

However, the computer may also present its own set of barriers; the ability to interface with the computer may be compromised by a person's disability. This section identifies solutions to access barriers in the form of alternative computer input (keyboarding and cursor control) and computer output (sensing monitor and printer outputs). It also examines the role of the computer as an assistive technology tool and suggests issues to consider when purchasing computer equipment.

Computer Access: Input Devices

For the individual who is unable to use a standard mouse or keyboard, alternative input devices can provide solutions for computer access.

Alternative pointing devices. Pointing options are available for the individual who finds the standard mouse difficult to use. Some options require very little movement; others use the larger muscles and require less hand dexterity than the traditional mouse. Foot and head controlled mouse alternatives are also available.

Head pointing devices enable the user to perform mouse functions with head movements. Software can provide an onscreen keyboard for text entry using the head pointer. Mouse clicks can be performed with switches such as sip and puff, shoulder shrug, eye-blink, or Dwell control software that enables the user to perform mouse button functions with head movement. Pointing devices, designed for head pointing, can also be used with any other part of the body where the user has reliable control.

Trackballs are available with additional programmable buttons that enable users to perform mouse functions such as double click and drag with a single button activation. Programmable buttons can be particularly useful for individuals who use typing splints or typing sticks for keyboard entry.

Keyboard alternatives. Alternative keyboard styles provide larger and smaller formats for individuals with limited dexterity or limited mobility. Other hardware options provide hand positioning that may be more appropriate for an individual or keyboards that require very light activation pressure.

Alternative keyboard layouts that remap the positions of the letters on the keyboard are available. The Dvorak keyboard places the most frequently used keys on the home row, consequently reducing movement and increasing typing speed for the experienced user. Dvorak layouts are available for both two-handed and single-handed typists, and with it, single-handed users can become efficient touch typists. Other keyboards are available with frequency-of-use or alphabetic layouts. Remapping the keys can be accomplished with software, and press-on labels can be used to change the letters on a standard keyboard.

Switch control. Scanning is an option for individuals who have little control over physical movement and who use a switch for computer access. Switch control is a system where selections are sequentially highlighted and user selects the word, letter, or function by activating a switch at the appropriate time. Another input possibility using switches is Morse Code and through the use of this code system, a reasonable typing entry can be achieved with action of one or two switches.

Speech recognition. Voice control of computers is one of the fastest growing areas of technology, and as the technology has improved, it has also become more affordable. Voice recognition software is available that enables the user to dictate and format text, access menu items, control the cursor, and open and close applications with voice commands.

It is difficult to make recommendations about speech recognition technology because the technology is changing so rapidly that what is written today may not be true at publication time. The World Wide Web is a good source of up-to-date information on technology. An excellent source of information on speech recognition as an input system for people with disabilities is the Center for Accessible Technology's website at http://www.el.net/CAT/.

The following is a list of basic considerations regarding speech recognition software:

- Voice recognition is a viable means of computer input for many individuals with disabilities.

- Consistency of speech is a more significant factor than clarity of speech when considering voice recognition as an input method.

- Voice recognition technology can be cognitively and visually demanding; it is not for everyone.

- Training is required for speech recognition software. Failure to provide training will likely lead to frustration and subsequent abandonment of the technology.

- As the technology for speech recognition continues to change, the population for whom this technology is appropriate will likely expand.

Software based adaptations. Software options are available that reduce the number of keystrokes required of the typist. Word prediction software presents a list of possible words as letters are typed. If the desired word is presented, the typist can select it with a single keystroke. Some word prediction programs also predict the next word based on context and past usage. Abbreviation expansion replaces a typed code or abbreviation with a longer string of preprogrammed text. Another software option, referred to as Sticky Keys, allows the user to strike keys in sequence that are generally required to be entered simultaneously, such as the shift and control keys.

Computer Access: Output Devices

As a result of visual impairment, cognitive impairment, or a learning disability, individuals may be unable to read a computer screen effectively. For these individuals, software and hardware devices are available that convert information on the screen into more accessible formats.

Screen readers. Software applications that work with speech synthesizers to convert text on the computer screen into synthesized speech.

Refreshable Braille. Displays that connect to a computer and provide dynamic computer output in Braille format through raised dots on the device. The display refreshes or updates as the user moves to a new section of text.

Braille printers. Paper documents are produced in Braille format.

Display options. Screen magnification and alternative color displays make computer screens easier to read for individuals who have low vision or light sensitivity. Changing the colors and size of the display may also help individuals with learning disabilities.

Case Study: Jane, who is blind, works as a customer service representative for a nationwide auto glass repair service. Jane receives calls from individuals and insurance agents who need broken auto glass fixed and refers them to a local firm for the necessary work. She uses both voice synthesis and refreshable Braille technology to access data from the computer screen. While on the phone with the customer, she must be able to hold a conversation with the person and read and enter information into the computer. A Braille display that presents the information 40 characters at a time meets the need to be able to read and listen to the caller at the same time. Speech output, heard in her other ear, allows Jane to access more technical functions from the computer system. A special accommodation was made when a database, which sighted co-workers read as printed sheets in a book, was put on-line for Jane.

Jane felt she had been hired because of her work ethic and good customer service skills, not because anyone felt sorry for her. She also reported it was important that the computer work for her, meaning that as a Braille reader she was able to use her computer in Braille.

The Computer As a Tool

Assistive technology is often used to enable a person to access a computer. However, computers may also be used *as* assistive technology. The Tech Act of 1988 refers to assistive technology as a tool that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. This section focuses on the computer in that role.

The Internet, e-mail, and fax. Fax machines, e-mail, and the Internet have become commonplace in most employment settings. Persons with disabilities who have difficulty accessing traditional office equipment are often able to correspond, send and receive printed documents, and conduct research using these telecommunications tools. Newspapers and other periodicals are available on-line, making them accessible to the blind and others with print disabilities. Encyclopedias and other research media are available on CD and on-line, making information retrieval more accessible.

Information access. Once a computer is made accessible, a person who would have difficulty going out to pick up a newspaper or magazine can access information through the Internet. Job banks, resume services, and other employment resources also become available. Mail can be opened through e-mail without manipulating paper and envelopes. The computer and Internet can be used to overcome transportation and manipulation barriers encountered in the quest for information. Similarly, for persons who are blind or have a learning disability, information can now be secured simultaneously with the rest of the world through the Internet rather than waiting for taped or Brailled versions.

Scanner and optical character recognition (OCR). By using a scanner and OCR software, an individual who uses a screen reader can transform print material into spoken text. This is helpful for any individual who has difficulty reading printed text. The combination of a scanner and OCR software can also prove helpful for an individual with a mobility disability who cannot handle or organize paper files.

Compensatory software tools. The computer can be a powerful tool for individuals with dyslexia, attention deficit disorder, or other learning disabilities. Grammar and spell check software, programs that read highlighted words or sections of text, and word-prediction programs that present words for the user to select can assist the individual who has difficulty with composition and editing tasks. Changing the appearance of the computer screen may help individuals with attention deficit disorder. Multi-sensory reading programs allow the user to customize background and foreground colors, font size and style, and voice characteristics. Graphics can be added to documents to improve comprehension. Talking dictionaries pronounce and define new words.

Computer Hardware and Software Purchasing Issues

Compatibility issues. When assistive technology systems combine hardware and software from more than one manufacturer, compatibility issues must be addressed. It should not be assumed that all hardware devices will work equally well with all software or that two software products designed for the same operating system will necessarily work well together. It is important to check with manufacturers and research compatibility issues before attempting to set up a system with a number of elements. A technology specialist who is familiar with the products in question should be consulted when selecting and purchasing a system made up of multiple pieces.

Upgrade issues. Technology is changing rapidly and any technology item purchased today will some day become obsolete. How quickly that day arrives will depend on purchasing decisions made now. Choosing to buy last year's technology in order to save money today may mean that the technology will need to be replaced or upgraded considerably sooner. Planning for upgrades at the outset can save considerable cost and frustration later. A computer system that uses proprietary hardware or software may be difficult or impossible to upgrade.

Home-Based Employment

Telecommuting

The wide availability of the Internet has transformed communication and information retrieval. Articles in the popular press report a large number of workers are now telecommuting from their homes. This revolution in the workplace has benefits for persons with disabilities. For some individuals, transportation presents one of the greatest obstacles to employment; persons having the tools and technology needed for self-care, communication, and mobility in their homes often must duplicate or transport these tools to the workplace at considerable effort and expense. The ability to work from home can save considerable time, money, and effort. An individual who can access a computer can use e-mail and fax technology to connect to employers, customers, and other business contacts. Technology-related business opportunities exist for individuals working from their homes, including consulting, software design, software testing, website design, and other computer-related applications. The potential of videoconferencing from a home-based computer system adds a personal touch and increased integration to this employment option.

> **Case Study:** Bob was referred for a combined assessment of vocational potential and potential to benefit from assistive technology. Bob was intelligent, able to speak well, and restricted to lying in bed in a stationary position by a medical condition that had atrophied nearly all his muscles. Prior to his condition worsening, he had experience on computers in school and was aware of the Internet. Bob expressed interest in designing websites and was provided with a voice-activated laptop computer and Internet service. This portable computer permitted him to easily change the position of the screen depending on his position in bed.
>
> Bob received training and practiced using the computer and voice technology and then explored the Internet through voice control. Eventually, he took coursework in website design through the Internet from a school 2,000 miles away. Upon completion of the program, he began accepting work as a consultant designing websites for area businesses and institutions.

Adapted Farming

Agricultural-related adaptation has developed into a field of its own. Adapted farming is difficult due to the large number of functions involved in operating a farm, the physical nature of the work, and the varying environments in which the work is performed. Issues related to farm adaptations include equipment access, mobility, safely handling animals, and other work-related adaptations. Specific designs for lifts have been developed to allow farmers to access tractors. Adapted barn facilities, such as milking parlors, can be designed to accommodate for a physical disability. All-terrain vehicles (with or without adaptations) have become popular for the farmer to access areas of the yard, buildings, and fields. Universal Product Code (U.P.C.) and scanners allow for computer recognition of animals and easier record keeping for farmers with visual impairments.

Marketplace Issues

A number of issues in the marketplace need to be addressed in understanding the products available for use as assistive technology solutions. Whenever possible, it is best to select products marketed to the general population rather than those marketed specifically to persons with disabilities. In general, the larger marketplace provides products that are less expensive and more compatible with other commercially available products and environments.

Universal Design

The Trace Center (1995) defines universal design as the principle that all products should be designed to be usable by all people, to the greatest extent possible, without adaptations. Products are increasingly being designed to be more user friendly for all consumers. Examples are the controls on many appliances have large markings and are easy to reach, most home and automobile accessories have been designed for ease of use and adjustment, and software features can be customized for individual user preference.

The Cost of Adaptations

Assistive technology is not only super-powered computers and augmentative communication devices. Simple interventions, such as a pencil gripper, are also considered assistive technology. Often low cost devices or no-cost modifications to the process flow are all that are required for a worker to be more productive and successful.

The cost of high technology solutions is also decreasing in many cases. Speech recognition technology has improved to the point where software producers are now marketing their products to the general population. As a consequence of this larger market, there has been a remarkable drop in price. Several years ago, speech recognition software cost thousands of dollars and the hardware requirements were far in excess of what could be found in the typical office computer. Now speech recognition products that will run on many high-end home and office computers can be purchased for under $200.

An increase in the availability of technology continues to drive down the cost of many technological accommodations. Radio Shack's 1997 Holiday catalog listed these items that can be used by individuals with disabilities and individuals who are nondisabled:

- Talking alarm clock key chain, $8.99.
- Micro cassette notetaker featuring hands-free recording, $39.99.
- Phone directory and auto-dialer (hold up to the phone and it dials hands-free), $24.99.

Heartland America's 1997 Christmas catalog offered the following:

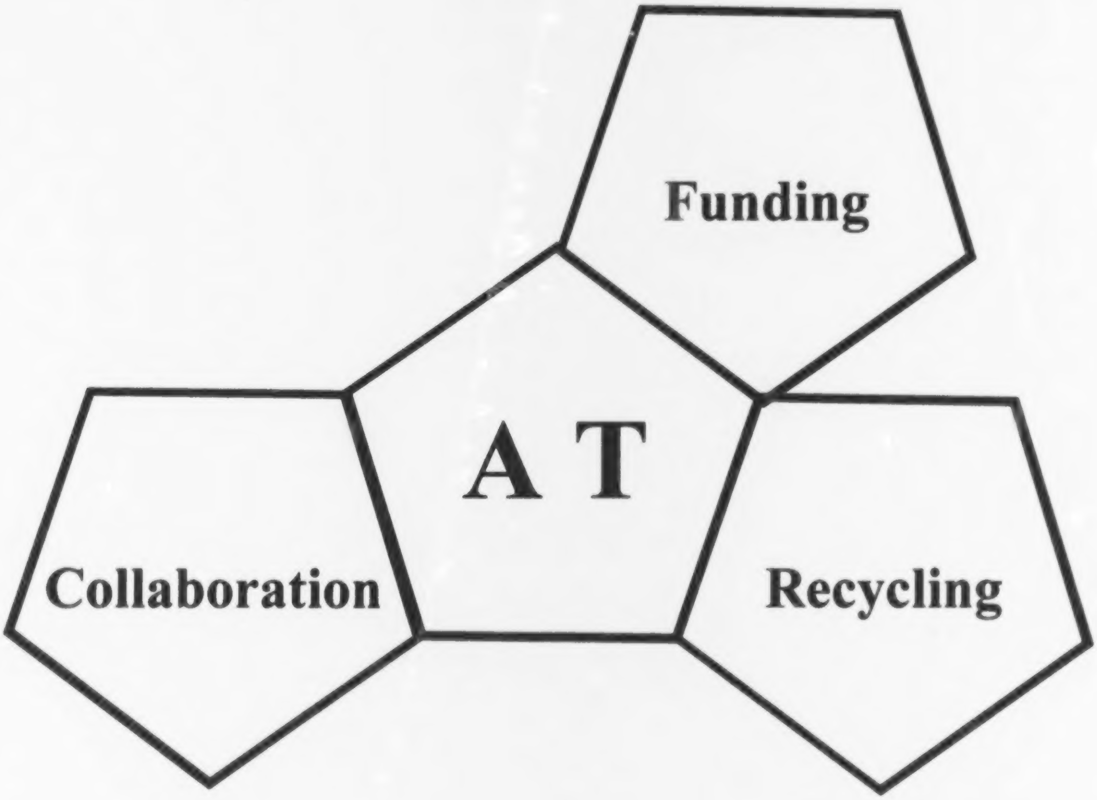
- Voice It Digital Recorder (digitally records voice messages on memory cards so they can be downloaded to a PC for a permanent transcript), $249.99.
- Clock that projects up to four feet wide on the ceiling, $39.99.
- Monocular that is only 2 inches long, $29.99.

In addition, many items that are readily available in office supply stores and the general marketplace can be used as assistive technology. Examples include adjustable keyboard trays, document holders, footrests, and ergonomic office furniture. The availability of these products makes for a wider range of options to meet the needs of persons with disabilities. Even with this expansion of AT availability, it is important to creatively apply innovative approaches to meet the individual consumer's needs.

Chapter Highlights

- The AT process
- Technology to maximize function in preparation for rehabilitation and employment
- Technology in the rehabilitation process and employment

Chapter VI
Innovative Approaches to Assistive Technology



Introduction

Assistive technology in today's environment is viewed by consumers and practitioners as essential for full integration in the home, school, workplace and community. This perspective is creating tremendous pressure upon public rehabilitation agencies to develop creative strategies and effective methods to meet consumer demands and funding requirements with fewer resources. New and innovative relationships among public, private, and non-profit organizations and creative strategies capitalize on individual strengths of each organization in forging new cost effective and service delivery systems.

This chapter examines innovative approaches and new strategies available to the AT team, such as technology recycling, exchange programs, and low-interest loans, that are proving to be powerful tools for assisting consumers in securing the technology they need.

Alternative Funding Resources

Assistive technology can pave the way to equal opportunity, increased self-sufficiency, and increased independence for people with disabilities. Unfortunately, many remarkably useful devices such as environmental control systems, communication devices, and voice-activated computer systems cost thousands of dollars. While the National Center for Health Statistics (1990) indicates that more than half of those using assistive technology devices purchased those devices themselves or with the help of families and without any assistance from third-party payers (e.g., rehabilitation services, Medicaid, Medicare), such devices are often out of reach for individuals with limited incomes. Funds available through rehabilitation services and other agencies are typically insufficient to provide devices for everyone who needs them. Innovative equipment lease options, cost-sharing among agencies, and low-interest financing for assistive technology have been offered as viable alternatives to single agency or private funding with an increasing focus on the latter (Wallace, 1994).

Special Loan Programs

Assistive devices are not seen by traditional lending institutions as appropriate collateral because resale value is questionable and the potential life of the product is limited. Sporadic work histories and limited incomes make it difficult for many individuals with disabilities to meet the credit requirements of most lending institutions. Creative low-interest loan alternatives for technology have been created primarily through state technology programs in partnership with banking or other lending agencies. Programs range from $50,000 to over $6,000,000 in total fund amounts and are revolving so that as loans are repaid, funds are reinvested into loans to others. Typically provided only to individuals with disabilities, loans are made for amounts ranging from $250 to $10,000 and up with interest rates that vary from zero percent to above prime and flexible terms depending on the needs of the individual. With typically low default rates, these programs are proving to be very effective alternatives to personal or agency financing and a great new option for rehabilitation professionals to consider when in counseling individuals.

Recycling Technology

The benefits of assistive technology to enhancing education, employment, and independent living for individuals with physical or mental disabilities are well known. Hence, millions of rehabilitation service dollars (and those from other public and private sources) are spent on low and high assistive technology every year. Rehabilitation counselors previously have had no options except to purchase new equipment whenever it is required, assist the individual to develop purchase options, or help the individual manage without needed technology. It is estimated that up to 30 percent of devices purchased go unused for various reasons, yet this technology could provide tremendous benefit to others at a cost substantially lower than that required for new devices, thus maximizing rehabilitation service and other dollars (RESNA, 1995).

Through collaborative networks, alliances and clearinghouses created mostly through state technology programs, recycling efforts have provided the vehicle for individuals with disabilities to find technology they need. Most technology recycling programs warehouse donations of gently-used assistive technology devices, such as wheelchairs, walkers, reachers, and computer equipment, which are refurbished as needed and recycled. Depending on agency desire and warehouse capacity, acceptance of devices can be restricted, placing limits on items that are more difficult to recycle (e.g., those requiring a doctor's prescription, biomedical, medical or sensory devices, hygiene products) or items that require extraordinary space, like hospital beds. While not everyone's needs can be met through recycled devices, those who do find needed devices can do so for little or even no cost. The costs of operating a recycling program correlate with the level of effort and are eased if several agencies collaborate to provide this service.

Equipment Demonstration Centers

The types and versions of particular technology devices are complicated, and changes are evolving daily in this fast-paced world. Typically, professionals and individuals with disabilities are not knowledgeable about available devices, nor do they have time and resources to stay abreast of emerging technologies. Thus, it is often difficult to know exactly what type of device might prove helpful to a particular individual.

Equipment demonstration centers established by state technology programs address knowledge gaps by providing a wide assortment of state-of-the-art devices available for hands-on demonstrations. Trained staff give participants the critically important opportunity before purchasing to see how a specific device works and if the consumer can effectively use it. Centers may offer a number of other services–public domain/shareware copying services, device-specific training for rehabilitation professionals and individuals who will be using particular devices, evaluation/assessment, counseling on service delivery options and funding. Resource centers also provide an opportunity for rehabilitation professionals and employers to see technology applications in the employment arena.

Equipment Loan Banks

One of the reasons purchased technology sometimes goes unused is because there was no opportunity to try out the device in a meaningful way prior to purchase. Often technology purchases are made from catalogs, without seeing the device operate. Equipment demonstration centers offer rehabilitation professionals the ability to see how a particular device might work, though demonstrations alone do not assure that equipment demonstrated will work for a particular individual.

A number of state technology programs have established equipment loan programs that move a step beyond merely seeing a device demonstrated to offering state-of-the-art equipment for loan. Being able to use a device for a few days to a few weeks permits the user and rehabilitation professional to determine if the chosen device can effectively be used in real-life settings and situations, instead of only in the orchestrated environment of demonstration centers. Consumers can try out a device and evaluate its effectiveness in the environment of use, thus preventing an unused purchase not adequately tested with consumers or in the appropriate situation. Loaned devices also enable individuals to begin working while waiting for delivery or to continue working while the original device is being repaired.

Components of Comprehensive Loan Programs

- Maintain a large and diverse inventory of devices.
- Secure skilled staff with comprehensive knowledge about available devices, who can provide careful assessments and facilitate the selection of the most appropriate device.
- Provide one-on-one training in use of a device.
- Localize services as much as possible by reaching out into communities.
- Offer personal delivery of equipment and on-site instruction to borrowers.
- Provide opportunities for consumers to try out devices in their own environment.
- Provide replacement loans when devices are being repaired or modified.
- Network with other organizations and agencies.

Telecommunication Device Distribution Programs

Since the breakup of AT&T in 1984, most local telephone companies no longer provide telecommunication equipment for consumers with disabilities. Private companies and equipment distribution programs have stepped in to fill this gap. Equipment distribution programs assist consumers with disabilities in a variety of ways. Some programs provide equipment at no cost or a reduced cost. Others lend equipment on a short- or long-term basis, either free or for a nominal fee. Finally, some equipment distributions programs do not actually distribute equipment but act as a referral source for purchasing equipment or obtaining financial assistance to purchase equipment.

The Tele-Consumer Hotline surveyed telephone distribution programs in 1996, finding 47 separate programs located in 45 states. Some service areas encompass an entire state and others are smaller organizations whose service area may cover only a city or county. Many of the programs focus on individuals with speech or hearing impairments. Equipment that would assist someone with a speech impairment may include speech amplifiers, artificial larynxes, text telephones (TTY), or augmentative communication devices. An individual with a hearing impairment may benefit from equipment such as a telephone with an amplifier built in; a handset amplifier; light, tactile, or loud bell signalers; or TTY. Some programs provide equipment to assist individuals with vision or motion impairments and include big button phones, dialing aids, and voice activated phones. For individuals who are deaf/blind telebraillers may be provided.

Equipment distribution programs often have demonstration centers so individuals can test-drive various types of equipment. Before equipment is provided, some programs require that the individual demonstrate knowledge and ability to use the piece of equipment and will usually provide training, as needed.

Application procedures and requirements that must be met vary from program to program. Requirements may include certification of impairment by a medical professional, proof of financial need, proof of current residential telephone service, or lack of existing assistive devices in the household.

Vehicle Rebate Program

Advancements in automotive industry technology enable individuals with motor and/or hearing impairments to safely enter, ride in, or drive cars, vans, and light trucks. However, modifications such as wheelchair lifts, hand brakes, raised roofs or alerting devices can be expensive.

The major automobile companies offer programs that provide cash incentives or reimbursements to help finance the purchase and installation of adaptive driving aids and passenger equipment. Most of the programs are available for a vehicle model year.

Experts On Line

The Internet makes opportunities available for quick and easy exchange of information.

Vocational rehabilitation professionals and assistive technology specialists can utilize the Internet by establishing an *experts on line* initiative. This approach to providing technical information entails developing/utilizing a webpage, enabling professionals to share expertise/knowledge and to have questions answered about assistive technology. Experts would be identified by the agency and might be agency staff or outside consultants, such as rehabilitation engineers, assistive technology specialists, occupational therapists, physical therapists, speech pathologists. Counselors or vocational evaluators could request information on specific commercially available devices that assist a consumer in performing a certain job function. Assistive technology specialists could send inquiries to each other about individual cases to get additional ideas and input before they finalize recommendations to the rehabilitation professional. By handling these inquiries on a listserve or webpage, others can also access the information easily, thus increasing assistive technology knowledge for many.

Consumer Reports

As direct users of assistive technology, persons with disabilities have a wealth of information to report on what has worked for them, what has not been effective, and often, why it didn't work. The same concept of gaining critical information successfully utilized by *Consumer Reports* might be implemented by vocational rehabilitation professionals and assistive technology specialists. An information collection process could be set up through traditional mail or phone surveys. The agency could seek input through the Internet for consumers to report on their use of assistive technology; a short response form could be added to an agency webpage for consumers to report assistive technology successes and glitches.

Other Methods Useful in Soliciting Input From Consumers

- Electronic bulletin boards.
- Articles in consumer organization newsletter.
- Consumer organization meetings to discuss assistive technology issues.
- Vocational rehabilitation consumer satisfaction survey.
- Consumer advisory groups.
- Rehabilitation councils.

Reassignment of Assistive Technology From School to Vocational Rehabilitation

Vocational rehabilitation professionals can create an option that is a win-win situation for students with disabilities, vocational rehabilitation, and public schools–the reassignment of assistive technology *with* the student as (s)he exits school and enters adult services. Counselors would weigh the advantages and disadvantages of purchasing a new device against the benefits of a consumer continuing to use equipment that was successful in school. If the latter, VR would purchase equipment owned by the school at a depreciated rate, which the student could effectively use as (s)he enters post-secondary education or employment.

Currently, the state government approval and purchasing process means students exiting school may experience downtime in having use of appropriate assistive technology. To be without assistive technology for a length of time might mean delaying education or work and may also slow rehabilitation. In instances where equipment is highly specialized, customized, or programmed specifically for the individual, it is possible that (a) it is not practical to consider a different device and the consumer may not want to invest a large amount of time in learning its use, and (b) the school system may not be able to use the equipment with any other student. Vocational rehabilitation counselors could stretch their limited budgets and meet the consumer's need for assistive technology in a more timely manner by choosing the reassignment of assistive technology from school to a VR option when it best meets the needs of the individual.

Used Equipment Exchange

Equipment exchange programs, designed after newspaper classified ads that link buyers and sellers, are another resource for used technology. Individuals or businesses interested in selling, trading, loaning, or giving away used assistive technology devices are entered into a sophisticated database. Devices are generally categorized according to type and a list of available devices is available to counselors and other professionals through agency newsletters and/or the Internet. Instead of being warehoused as is done in the technology recycling programs mentioned earlier in this chapter, equipment listed on an exchange is kept by the owner, which limits agency liability and space demands. Program staff (or volunteers) link those interested in a particular device with the owner. All negotiations of cost and transfer of devices are left to the interested parties. Items are generally tracked and often automatically deleted after six months. The types of items recycled can be restricted to those specifically related to various areas such as daily living, mobility, communication, and employment. This program is easily networked throughout state and local rehabilitation agencies and can be a collaborative effort with area employers, medical facilities, rehabilitation centers, and individuals who are currently or have been served through rehabilitation services.

Assistive Technology Lemon Laws

Rehabilitation counselors work hard to ensure that supports are in place for people to effectively complete their rehabilitation programs. When assistive technology is part of that program, it is vital that devices work, or the results can be devastating and bring a program to an abrupt halt. A lift breaks down and a person needing restoration services cannot make a doctor's appointment; a wheelchair malfunctions and an office clerk is unable to get to work; or a communication device fails, and a student can't participate in a training setting. When problems with the device continue, it not only delays successful closure but can cost the rehabilitation service agency many wasted dollars.

For years, consumers have been protected against the purchase of lemons in products or equipment with substantial and continuing defects that are not the fault of the consumer (RESNA, 1995). In recent years, persons with disabilities have demanded and, in many states, won the same protections as other consumers for their purchases of assistive technology. While laws vary from state to state, they generally provide warranties for new assistive devices and set time limits for those warranties. The warranty (typically one year) on assistive devices and equipment begins on the date of delivery, not the date of purchase, since the time between purchase and delivery can be from a few weeks to many months.

While some state laws cover all assistive technology over a specific dollar amount, most cover only motorized wheelchairs. Manufacturers must disclose any defect that impairs the use, value or safety of the device at the time of sale or resale. Costs for repairs or replacement are addressed and most have provisions that the manufacturer provide a replacement device or reimbursement for temporary replacement devices while the original is being repaired.

Laws are careful not to cover defects that result from misuse or alterations. Since people cannot gain full benefit from technological devices unless they function properly, lemon laws are critical and assure that the consumer, whether an individual or rehabilitation agency, is protected.

Collaboration

Across the nation, collaborative efforts between vocational rehabilitation agencies and public, for-profit, and nonprofit organizations are forging new, more cost effective and efficient service delivery systems, establishing a number of exemplary initiatives. Some examples of these are discussed below. To learn about efforts in your state, contact the appropriate State Technology Project (see Chapter VIII, *Information Resources*).

Employer Job Accommodation Center

Maryland's Work Tech Program provides a single point of entry for employers seeking job accommodation strategies for their employee(s). Information and consulting services include tollfree information and referral, reprints of publication articles, professional print and video library, electronic and Internet information resources, and job accommodation/accessibility consulting. Employer training is focused around a universal workplace demonstration center that provides working examples of how a typical office environment can be adapted for persons with physical, sensory, or cognitive impairments. Ergonomically designed workstations include access to mainstream business applications and electronic information resources. Services include demonstration of readily available commercial products, training in assistive technology in the workplace, and assistive technology device short-term loan programs.

The Center's most innovated service is that an employee requiring a job accommodation can apply directly to vocational rehabilitation and, if eligible, receive comprehensive worksite accommodation assessment services. These are provided by a multi-disciplinary team comprised of medical clinicians, technology specialists, career evaluators, placement specialists, and other VR staff as required. The team is selected and directed by a VR work site accommodation consultant assigned to the Employer Job Accommodation Center.

The Work Tech Program is a collaborative effort of Maryland's State Vocational Rehabilitation program, the State Technology Project, and the Governor's Office for the Employment of Individuals with Disabilities.

Engineering Volunteers

Cooperative agreements can be signed between vocational rehabilitation and nonprofit engineering volunteer organizations. Volunteer engineers, design technicians, and health professionals can develop one-of-a-kind specialized rehabilitation products that enable an individual with a disability to become or remain economically self-sufficient. Volunteer collaborations have produced thousands of products ranging from a ball-joint hand brace for a quadriplegic architect to an eye-blink augmentative communication device. In addition to engineering applications, these groups can also test and repair consumer equipment, loan computers and assistive technologies to consumers, and act as a demonstration and training center for VR counselors.

Community Volunteers

Across the country new partnerships have been formed with community organizations. The Ramp Project in Saint Paul, Minnesota, solicits volunteers to build wheelchair ramps, utilizing a new concept in wheelchair ramp design. Ramps are reusable and adaptable to varied home situations and can be built quickly, safely, and easily using modular components with no footings required. This unique process makes the ramps affordable to all, at about half the normal cost. The modular ramp program was started as a joint project of the state vocational rehabilitation agency, a metropolitan center for independent living, and two nonprofit disability organizations.

Training for Vocational Rehabilitation Counselors

In states where cooperative agreements exist between vocational rehabilitation and the State Technology Project, or where VR receives direct subgrant funding, Tech Act projects are providing extensive state training programs. Training opportunities are also provided through the National Institute on Disability Research and Rehabilitation (NIDRR) and Rehabilitation Services Administration (RSA). Training topics include general orientation to assistive technology, successful job accommodation strategies, funding options, and Tech Points. Trainings range from a few hours on a specific topic to comprehensive training conferences lasting several days. To learn about training opportunities in your state, contact the appropriate State Technology Project (see Chapter VIII, *Information Resources*).

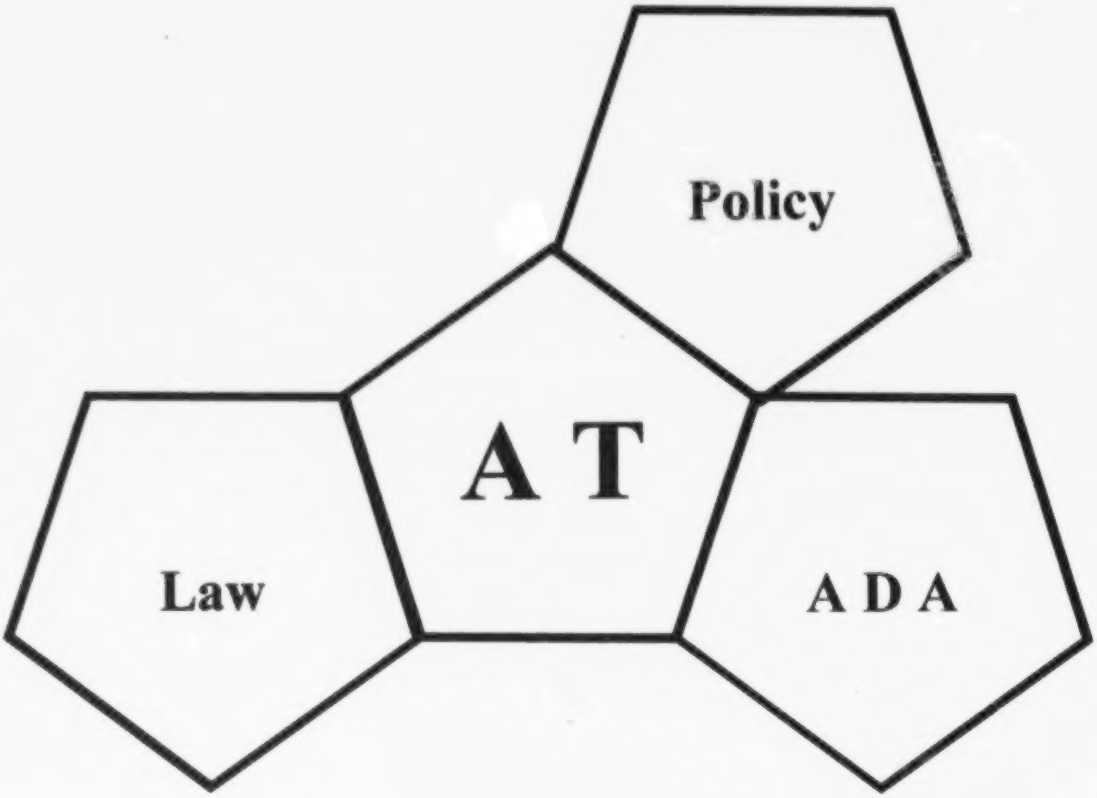
In Maryland's Technology Assistance Program, extensive counselor training has been initiated to develop a network of in-house work incentive specialists. The underlying assumption is that every consumer eligible for Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI) should receive counseling on the impact of work on benefits and options for using work incentives such as the Plan for Achieving Self Support (PASS), Impairment-Related Work Expenses (IRWE), and Blind Work Expenses (BWE).

Innovative approaches to assistive technology are not legislatively required, but they are critical to rehabilitation organizations in the achievement of successful competitive employment outcomes for their consumers.

Chapter Highlights

- Innovative funding approaches
- Redistribution of AT
- Informational linkages
- Collaborative efforts

Chapter VII
Legislative Foundation



Introduction

Innovation in assistive technology almost always has its roots in legislation. This chapter describes significant laws and policy developments since 1986, which are the foundation for providing AT services to persons with disabilities.

Rehabilitation Act Amendments of 1998 (P.L. 105-220)

On August 7, 1998, the title of the Rehabilitation Act of 1973 is amended "to create linkage between State vocational rehabilitation programs and workforce investment activities carried out under *Title IV* of the *Workforce Investment Act of 1998* . . . .," a comprehensive job training bill that consolidates a variety of federally funded programs in an attempt to tackle the current labor shortage of skilled workers. Its purpose is "to consolidate, coordinate and improve employment, training and literacy, and vocational rehabilitation programs in the United States."

Key points related to AT:

- Emphasizes employment as the intended outcome of the services provided by state VR agencies, including the appropriateness of telecommuting, self-employment, and business ownership as employment outcomes.
- Increases access to VR services by strengthening the language regarding the presumption of benefit and requiring the state VR agency to explore an individual's abilities, capabilities, and capacity to perform in work situations, through the use of trial work experiences with the use of appropriate supports.
- Each state VR agency is required to report information on the types of AT services and devices provided under the program.
- The Individualized Plan for Employment (IPE) must include a description of the AT services and devices needed to achieve the employment outcome.
- Strengthens and expands on the concept of informed choice incorporated into the Act in 1992.
- Independent living definition to include personal transportation or public transportation.
- Cross-referenced to the Technology Related Assistance Act.
- The Commissioner shall conduct studies and analyses of exemplary practices including providing AT services and AT devices.

Technical Assistance Circular: Rehabilitation Services Administration (RSA-TAC-04)

On September 29, 1998, Rehabilitation Services Administration Commissioner, Fredric K.

Schroeder, issued a technical assistance circular to all state vocational rehabilitation agencies to clarify the responsibilities of state VR agencies and various parties in the provision of rehabilitation technology. RSA-TAC-04 is in response to inquiries asking whether the state VR agency or the individual's employer has primary responsibility for providing rehabilitation technology to an individual with a disability who is a consumer of the state VR agency.

Key points related to AT:

- A consumer of the VR program must be provided necessary rehabilitation technology at the time the individual needs the equipment to progress toward achieving an employment outcome consistent with the individual's IPE.
- State VR agencies are required to provide rehabilitation technology services as mandatory services not subject to prior comparable services and benefits determination as is required for other VR services. The exemption from conducting a search for comparable services and benefits does not prevent the state VR agency from taking advantage of resources, such as the employer or some other entity, that would provide ready access to a needed rehabilitation technology service.
- State VR agencies are encouraged to consult with projects supported by the Tech Act of 1988 in order to develop systems change initiatives and identify alternative sources of rehabilitation technology.

The Rehabilitation Act, as Amended (P.L. 102-569)

In 1986, a definition of "rehabilitation engineering" was added to the Rehabilitation Act to include a range of services and devices that can supplement and enhance an individual's functioning. This was followed by the Rehabilitation Amendments of 1992 that require each state vocational rehabilitation agency to describe in its three-year state plan how rehabilitation technology services will be provided to an increasing number of individuals with disabilities. (This requirement regarding the assessment of AT in the state plan is not included in the Rehabilitation Act Amendments of 1998.)

Section 504 provides individuals with disabilities equal access to programs, services, and activities receiving federal funds. Assistive technology services, or other accommodations, may be required to assure that these individuals are provided equal access to educational programs.

An important new direction was accomplished with the addition of Section 508 to the Rehabilitation Act, requiring federal agencies to provide workers with and without disabilities equivalent access to electronic office equipment.

Key points related to AT:

- Built on the foundation of the ADA.
- Empowers people with disabilities to make informed choices by requiring state vocational rehabilitation agencies to inform individuals about rehabilitation technology services.
- Requires states to describe how a broad range of rehabilitation technology will be provided on a statewide basis at certain key points of the rehabilitation process (during assessment, during service delivery, or as on-the-job accommodations following placement).
- Exempts rehabilitation technology services from a search of comparable services and benefits.
- Clarifies the meaning of "rehabilitation technology" to include AT devices and AT services.
- Requires states to provide rehabilitation technology training.

Policy Memo: Rehabilitation Services Administration

On November 16, 1990, Rehabilitation Services Administration Commissioner Nell Carney issued a policy directive to all state vocational rehabilitation agencies that sets important new guidelines concerning implementation of the 1986 rehabilitation technology amendments.

Key points related to AT:

- Each state must develop written policies to address the need for assistive technology during the entire rehabilitation process.
- An assessment of an individual with disabilities should consider how AT devices and services can (a) increase or supplement function, and (b) modify environments to accommodate individual abilities in the home and workplace.

Technology Related Assistance Act (P.L. 100-407)

The Tech Act provides financial assistance to states to plan and implement a consumer-responsive system of AT service delivery for individuals of all ages with disabilities. Assistive technology services and devices are defined in a broad context to stimulate creative problem solving, interagency coordination, and professional/consumer collaboration. States have broad discretion to target their funds to training, public awareness, service demonstration, policy analysis, and systems change. Unlike already existing public programs, this federal initiative represents the first time Congress targeted new public resources exclusively to expand access to AT.

The Technology-Related Assistance for Individuals with Disabilities Act Amendments of 1994 (P.L. 103-218)

These amendments strengthened the original Tech Act by requiring states to perform activities by providing funds to a protection and advocacy agency in the state.

Key points related to AT:

- Systems change, advocacy, and outreach to under-represented and rural populations.
- Protection and advocacy.
- Other allowable activities: interagency coordination, outreach, statewide needs assessment, public awareness training, program data compilation and evaluation, access to technology-related information, cooperative initiatives.

Americans with Disabilities Act (P.L. 101-336)

Signed into law on July 26, 1990, the Americans with Disabilities Act provides protection for people with disabilities from discrimination in employment, public services, transportation, public accommodations, and telecommunication.

In multiple approaches, ADA began to redefine the inclusion of assistive technology in the civil rights to be enjoyed by citizens with disabilities. Each title of the Act specifically references AT equipment or devices as a means of achieving access and equal opportunity. In Titles I and III, the purchase or modification of equipment or devices is included within the definition of "reasonable accommodation." On a case-by-case basis, access to employment opportunities or public accommodations must be weighed against a defense of "undue hardship" (a still-evolving standard to evaluate the degree of difficulty and expense to a particular business). In 1991– a critical year of regulatory development–the limits of access to AT began to be more solidly defined as part of reasonable accommodation in the workplace, commercial buildings, and public areas.

Title IV of the ADA expands access rights in the area of telecommunications. Telephone services offered to the public in every state must include interstate and intrastate telecommunications relay services for individuals with speech and hearing impairments.

Key points related to AT:

Reasonable accommodations may include

- AT as on-the-job modifications for qualified employees with disabilities.
- Removal or modification of barriers in architecture or equipment.
- Changes to the worksite that use AT to improve accessibility in the work environment or to minimize or reduce any risk factors in the work environment.

Discrimination may include

- Situations where entities fail to make reasonable accommodation, unless it can be proven that providing such an accommodation would cause "undue hardship."

ADA Tax Credit (P.L. 101-508)

Under the Omnibus Budget Reconciliation Act of 1990, a new tax credit was created for small businesses to provide additional incentives and assistance to meet the access requirements under the ADA. The credit amount allowed per tax year is 50 percent of expenditures, up to a maximum of $10,250. Acceptable expenses include removal of architectural, communicative, or transportation barriers. Coverage also included the purchase of modification of adaptive equipment or assistive devices as part of an effort to improve access to persons with disabilities. To qualify, a business must have gross receipts of less than one million dollars or fewer than 30 full-time employees.

Telecommunications Act of 1996

This law names the Architectural and Transportation Barriers Compliance Board and the Federal Communications Commission as the entities responsible for developing guidelines for access to telecommunications equipment by people with disabilities.

Key points related to AT:

- Establishes "readily achievable" as the means of determining if access to telecommunications equipment is required.
- If not readily achievable, manufacturers must ensure that telecommunications equipment is compatible with existing equipment commonly used by people with disabilities.

Individuals with Disabilities Education Act (P.L. 94-142)

In November of 1975, American children with disabilities won federal right to a free appropriate public education. Formerly known as the Education for the Handicapped Act, this landmark legislation was renamed the Individuals with Disabilities Education Act (IDEA) when it was amended in 1997.

As the most important education law affecting children with disabilities, this statute is also the primary authority that deals with technology for children receiving special education.

Key points related to AT:

- Requires public schools to provide special education services for children with disabilities that are necessary so they can benefit from education (i.e., children must meet categorical eligibility).
- Funding sources for AT must be identified (includes interagency financing agreements).
- Appropriate accommodations must be provided to allow children with disabilities to participate in assessments.
- Includes AT among the kinds of supports that should be considered in an Individualized Education Program (IEP).

Policy Letter: Office of Special Education Programs

On August 10, 1990, Dr. Judy Schrag, Office of Special Education Programs Director, issued a policy letter that clarifies the rights of children with disabilities to access AT.

Key points related to AT:

- AT services and devices may be considered special education, related services, or supplementary aids and services to enable a student with a disability to remain in the regular education classroom.
- Necessary AT devices and services must be appropriately included as part of the Individualized Education Program.

Other Policy Letters Issued by the Office of Special Education Programs

Over the past few years, most major legislation impacting children with disabilities has included technology-related services. However, experiences across the country have shown that although a federal/state program may pay for AT devices or services, questions remain about the manner in which these services should be provided. This has prompted the U.S. Department of Education's Office of Special Education Programs to issue various policy letters describing the conditions under which AT is provided to children with disabilities.

Key points related to AT:

- The need for AT is determined on a case-by-case basis; whether a child needs AT, if so the AT that appropriate for the child is determined on a case-by-case basis.
- Modifications made to the regular educational program must be in the IEP.
- There is no federal "approved list" of AT.
- Hearing aids may be considered AT; however, they would not be provided under IDEA unless the IEP team determines that the child with a disability requires it to receive a free, appropriate public education (FAPE).
- School districts can collaborate with state VR agencies to enable transitioning students to continue to use Part B funded AT for purposes of participating in a state VR services program based on the needs of the school district.

Employment Opportunity for Disabled Americans Act (P.L. 99-463)

The greatest public expenditures on behalf of persons with disabilities remain income maintenance programs. The two largest are Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI). In 1986, Congress approved new legislation to make it easier for people with disabilities to work and not lose their SSI benefits. As part of this public policy goal, Congress permanently authorized the Plan for Achieving Self-Support (PASS) program. Individuals who receive SSI, or who would qualify for SSI by setting aside income from their paycheck, are eligible to develop a PASS.

Key points related to AT:

- An approved PASS may be used to purchase work-related AT equipment or devices.
- A PASS must state a clear and realistic vocational goal and explain how the sheltered income will be spent within a specific timetable.

Statement on PASS: Issued by Social Security Administration on December 1, 1997

The Social Security Administration issued a statement that described a series of actions SSA would immediately implement to improve its administration of the PASS program.

Key point related to AT:

- Set aside funds for major purchases, such as AT, is still included and is still allowed.

Developmental Disabilities Assistance and Bill of Rights Amendments (P.L. 100-146)

The Developmental Disabilities Assistance and Bill of Rights Act reflects emerging best-practice supports and services within a value-based context for individuals with developmental disabilities and their families. During the 1987 re-authorization process, Congress added assistive technology as a priority for state planning and funding for system development and system change. With the 1990 amendments to the Act (P.L. 101-576), Congress modified the definition of AT to conform to the definition of the Tech Act. With this legislation, public focus on the financing of assistive technology was further advanced within a state system for planning and systems advocacy.

Medicaid Amendments of 1988 for Special Education Related Services (P.L. 100-360)

These 1988 amendments and accompanying report language explicitly offered states the option of including special education and related services under Part B of IDEA and those services included under Part H of IDEA as Medicaid-reimbursable services under the state's Medicaid plan. With this policy, Congress provided a major opportunity for states to access federal Medicaid funds for a full range of individual AT services without adding additional burdens to the local and state special education budgets.

Medicaid Early and Periodic Screening Diagnosis and Treatment Amendments of 1989 (P.L. 101-238)

Included within the massive Omnibus Budget Reconciliation Act of 1989 (OBRA), Congress enacted major changes within the Medicaid program required in all states called Early and Periodic Screening, Diagnosis, and Treatment (EPSDT). Although EPSDT has been one of nine state Medicaid-mandated services since its enactment in 1967, the states have had great discretion in interpretation and implementation of this benefit. As of April 1, 1990, the EPSDT Medicaid benefit was federalized. It mandates that all children from birth to 21 years of age currently receiving, or eligible to receive, Medicaid are entitled to the medically necessary diagnostic and treatment services for any physical or mental problem identified during such screening or assessment. Such services would be reimbursable under Medicaid if such treatment is covered under federal Medicaid law, even if those treatments are not in the state's Medicaid Plan (e.g., augmentative communication devices, wheelchairs, hearing aids, optical aids, including glasses). As a result of this amendment, a significant number of children with physical, sensory, or mental disabilities now have access to assistive technology.

Decoder Circuitry Act of 1990 (P.L. 101-431)

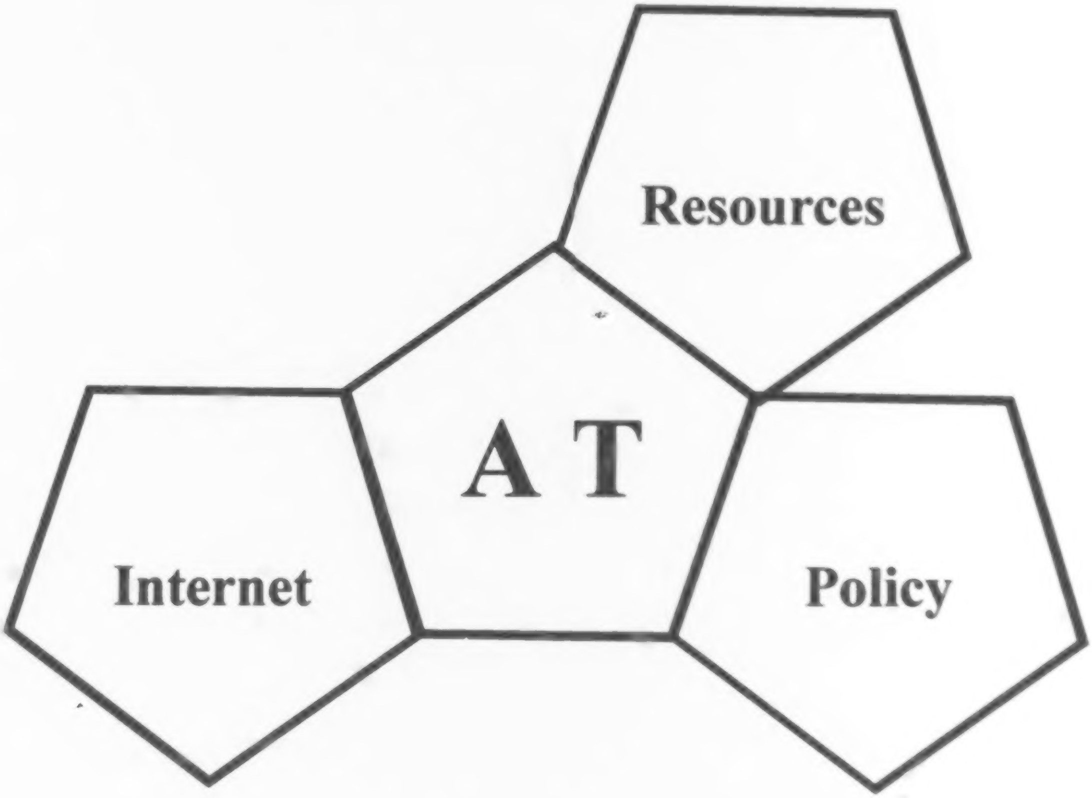
In yet another approach to expand public policy, new requirements are mandated for the manufacturers of television sets with screens 13 inches or larger sold in the United States after July 1, 1993. Televisions will be required to have built-in decoder circuitry to be compatible with current closed-captioning signals. This new mandate will assure that people with hearing impairments will be able to see captions on programs that provide them by merely flipping a switch on their television. The potential audience for closed-captioned programming for individuals with communication disabilities is estimated to be more than 24 million.

This summary of laws and policy statements intends to provide a basis for understanding the wide range of AT services and options that may be helpful in lessening the impact of some of the barriers to successful employment outcomes for persons with disabilities.

Chapter Highlights

- Rehabilitation Act
- IDEA
- Tech Act
- Related legislation
- Federal policy letters and directives

Chapter VIII
Information Resources



Introduction

The field of rehabilitation technology is constantly changing in terms of assistive technology devices and service delivery options. Three ways of keeping current are browsing the Internet, connecting with experts, and taking advantage of professional development opportunities. This chapter provides Internet resources intended to serve as starting/entry points for rehabilitation professionals to efficiently locate information about AT and its efficacy in achieving successful competitive employment outcomes. Over time, each rehabilitation professional will identify resources that best meet his/her specific needs. By sharing these strategies and information resources with each other, professionals will find the pool of knowledge about how to achieve successful employment outcomes greatly expanded.

Internet Resources

The Internet is the world-wide system of interconnected computer networks. It is a rapidly growing and valuable library of information, data, and resources. Currently, there are over thirty-six million computers and computer networks connected to the Internet. Through this vast system, millions of resources on disabilities, rehabilitation technology, successful job accommodation strategies, and employment opportunities are available.

The Internet is a valuable tool for persons with disabilities who have functional limitations affecting their ability to travel, communicate, and/or access goods and services. It offers a method to independently communicate, learn new skills, and seek/find competitive employment opportunities. Yet, many persons with disabilities cannot access computers even with the use of assistive technology. Cooperative efforts towards building a more universally accessible Web are ongoing.

The volume of resources available and the amount of clutter on the Internet can be exhausting, distracting, and confusing. However, if a structured approach to researching questions is utilized, and, if the information found is carefully evaluated, locating valuable information need not be difficult or time consuming. Guidelines for *Researching Your Questions on the Internet*, *Evaluating Information on the Web*, and *Information on Internet Resources* follow.

Researching Your Questions on the Internet

The following abridged article is reprinted with permission from Infinitec Inc., a joint effort of United Cerebral Palsy Associations, Inc. of Washington, D.C., and United Cerebral Palsy Association of Greater Chicago. The intent of the article is to provide assistance in using the Internet purposefully, as a source of needed information. Minor editing changes have been made to increase readability and consistency within this document. Additional material has been added and is indicated by *italics*. The most current unabridged version of the article can be found at http://www.infinitec.org/ learningsearch.html.

General Internet Research Tips

Get organized. Research time can simply vanish into the black holes of cyberspace without proper organization. Before beginning a search, list information needed, questions to be answered, or topics to be pursued. Stick to the list. It's all too easy to become distracted by the Internet's many byways, especially on the World Wide Web (WWW).

Use search engines and indexes. Search engines are specialized programs that search for specific topics on the World Wide Web, ferret out Usenet newsgroups or listserv mailing lists. Given a keyword or phrase, these programs set off like hound dogs, sniffing out the information wanted. Each search engine has its own rules and procedures; be sure to read and follow the directions for best results. The major Web browsers will serve up a preferred search engine or list of search engines (*AltaVista, excite, Infoseek, Lycos, Yahoo*) that will locate additional engines and lists. The larger Web sites have internal search engines, simply type in a key word or phrase, and the engine will search that Web site, saving time otherwise spent wandering through a large site.

Browse judiciously and leave a trail. Web browsing starts when visiting an interesting site, finding it includes an index to other sites, jumping from the index to a new site, discovering its index and jumping from there to a third site, which also has an index, and on to the next. This is why it's so easy to get lost on the Web and stray from the research goal. When browsing a site which may be re-visited, use the Web browser to set a "bookmark" before leaving the site. Later, the bookmark list can be used to return to the desired location.

The information superhighway has three lanes. The Internet researcher can cruise any of three lanes on the vast superhighway of the Internet: e-mail, file transfer, the World Wide Web. The World Wide Web lane is the most popular and is expanding the fastest but each lane of the information superhighway has meaningful destinations on the hunt for information about *disability, employment, and* assistive technology.

E-mail is many things. E-mail (electronic mail) conveys messages to individuals or to whole groups of individuals simultaneously. For example, e-mail can be sent to a certain well-known person at president@whitehouse.gov. E-mail is also the information distribution method used by newsgroups, which are online discussion groups, and listserv mailing lists, to which one can subscribe.

One of the positive things about e-mail is that people all over the world can communicate with each other without paying long-distance telephone charges and without waiting for conventional mail (known to e-mailers as "snail mail"). In addition, e-mail can be saved for reading later or re-reading and shared with others by forwarding.

Newsgroups. Newsgroups are carried on the Usenet system that connects hundreds of thousands of computers all over the world so users can discuss topics of common interest. Most–but not all–Usenet computers (news servers) are linked to the Internet and serve up many thousands of newsgroups.

Newsgroup discussions are not conducted in "real time," they are conducted on message boards; that is, using e-mail, a group member posts a comment or query for other members to read, then those who wish to respond post a message in reply. Newsgroup discussions are "threaded." Postings are organized so that a group member can follow the thread of a single discussion from its start to the most current message.

To find a list of newsgroups of interest, use a search engine (such as AltaVista) that can search Usenet. Using the words "assistive technology" to search AltaVista produces a list of 5,148 Usenet groups. In addition, some Web sites post lists of newsgroups. Try the sites at www.liszt.com/news or www.Tile.net/news that offer newsgroup search engines and helpful information about newsgroups in general.

Mailing lists. Mailing lists also depend on e-mail. Listservs are the most common type of mailing list; they are managed by a computer (the host) which automatically enters and deletes subscriptions to the list and broadcasts the list's content to all subscribers. Unlike newsgroups, in which anyone can read and respond to messages, mailing lists require one to subscribe in order to participate.

A number of mailing lists convey discussions in which an individual's e-mail to the list is e-mailed to every other member of the list, any of whom may e-mail a response, which in turn is e-mailed to every subscriber. When joining a mailing list, one's e-mailbox can rapidly become quite full. *(It is not necessary to respond to these e-mail messages.)* Alternately, a mailing list may be the means by which an organization e-mails news bulletins, fact sheets, newsletters, and other information to subscribers. (Infinitec Inc.'s listserv mailing list is this type.)

To find indexes of mailing lists on the Web try www.Tile.net/lists or www.liszt.com. Commercial online services with Internet gateways, such as AOL, provide help in locating both mailing lists and newsgroups. On the Web, list indexes are linked to forms that assist subscribing to chosen lists. As with newsgroups, there are appropriate ways to interact with a mailing list; Frequently Asked Questions (FAQ's) usually are available for assistance.

Whether communicating one-on-one or through newsgroups and listserv mailing lists, e-mail is an important–perhaps the most important–research option when dealing with topics, such as disability. Information about real, practical experience with assistive technology can best be had from people who have used the technology. Additionally, an online discussion group can turn into a valuable support community for people with disabilities, their families, and professionals who serve them.

FTP looks arcane, but it works. File transfer protocol or FTP describes a common method of accessing a remote computer (FTP site) and copying information (file) from the remote computer to a researcher's computer (downloading). It's often faster than downloading from the Web, but certainly not as pretty. Some FTP sites are restricted to registered users, such as university faculty or students, but there are thousands of anonymous FTP sites that are open to the public. To search out interesting FTP sites, try www.ftpsearch.ntnu.no, a Norway-based service, which yields a list of 50 FTP sites in response to the key word "disability." Many Web sites include indices of related sites.

The World Wide Web is king–for now. Because it is so easy to use, the Web has become the most popular part of the Internet. The Web owes its popularity and distinct character to HTML (Hypertext Markup Language), the code or "language" in which Web files (hypertext documents) are written. HTML's unique feature is its ability to create links that lead from one location on the Web to another. (The Web is the only part of the Internet that uses links.) A link is indicated by a word or words (usually underlined and/or distinguished by color) or a graphic (illustration). By clicking on a link, a researcher can jump to another place within a Web site or to a different Web site. Linking enables Web browsing, which is a good thing, but the mindless pursuit of links can get a researcher thoroughly lost.

A Web site is a location on the Web created and sponsored by a person or organization, and may include one or many parts, called "pages." Typically, the user enters a site at the home page, which is the main page or "front door" of a site. The "address" of a Web site is its URL (uniform resource locator). Given one or a few URLs, a researcher can be off and running through the Web in pursuit of various links.

Other Resources for the Internet Researcher

Additional sources of information about the Internet:

Bibliography. For a bibliography of nearly 900 reference works on the Internet, organized by topic, go to www.savetz.com/booklist.

Glossary. To access a glossary of Internet terms, go to www.matisse.net/files/glossary.html.

Internet training. A seminar kit useful in training people with disabilities and their caregivers to use the Internet is available from UCP Chicago's Communicorp division by calling 1-800-367-9274. The kit includes a videotape and printed guide.

Evaluating Information on the Web

The following abridged article is taken from a 1997 AIRS newsletter and is reprinted with permission from the Alliance of Information and Referral Systems, Inc. Minor editing changes have been made to increase readability and consistency within this document.

The Web is freedom of expression to the nth degree. One needs no credentials or extensive expertise to mount a Web site; all it takes is minimal assistance in putting it together and a place to put it. Until recently, only a few individuals had the experience to create a Web site or a place to mount it. That has changed. Today, many Internet Service Providers offer free space on their Web servers, together with assistance in assembling their pages. Subscribers merely have to select and complete a template form.

In theory, this electronic podium is the epitome of democracy. In practice, however, it can get sticky. Since everyone has total freedom of expression, sorting wheat from chaff can become complicated.

How You Gonna' Tell?

How does one evaluate Web information? There are no easy answers, but there are some general guidelines:

- Ignore the flash factor
- Look at the URL (Uniform Resource Locator - the site's address on the Internet)
- Is there any indication of Currency?
- When the site was first created
- When it was last revised
- When the links were last verified
- What are the author's credentials?

For More Information

There is a wealth of information on the Web for evaluating Web resources.

- www.vuw.ac.az/dis/courses/847/m2resevl.html
- lme.mankato.msus.edu/class/629/cred.html
- www.macomb.cc.mi.us/library/ineteval.html

Information on Internet Resources

An abundance, or overabundance, of disability-related assistive technology and workplace accommodation resources can be found on the Internet. The following resources have been selected because they provide a wealth of useful information, serve as a structured gateway to additional information, and meet the evaluative guidelines discussed above. The list is not intended to be exhaustive, but only to serve as a starting point. The first listing for each resource shows links to specific documents on the Web; the second is how to contact the producer by phone, mail, and electronically. This information is current as of July 1, 1998.

Disability-Related Information and Internet Resources

American Foundation for the Blind (AFB)

Accessing the Internet: What You Need to Know to Get Started and the Tools You Need to Find What You Are Searching For. http://www.afb.org/tc_inter.html

American Foundation for the Blind
11 Penn Plaza, Suite 300
New York, NY 10001
(800) 232-5463 (Voice)
E-mail: afbinfo@afb.org
Homepage: http://www.afb.org/afb

American Self-Help Clearinghouse

Self-Help Sourcebook OnLine offers a complete guide to organizations and people who can locate a local support group. http://www.cmhc.com/selfhelp/

American Self-Help Clearinghouse
Attn: SB
Northwest Covenant Medical Center
Denville, NJ 07034-2995
(201) 625-7101 (Voice) (201) 625-9053 (TTY)
Homepage: http://www.cmhc.com/selfhelp/

Disabilities, Opportunities, Internetworking Technology (DO-IT)

Disability-Related Internet Lessons - a series of lessons in using the Internet, covering subjects in Science, Engineering, Disability-Related information, Pine email, and more. http://weber.u.washington.edu/~doit/Lessons/disability_lessons.html

Disability-Related Resources on the Internet - including LISTSERV and LISTPROC discussion lists, electronic newsletters, newsgroup discussion groups, bulletin board systems accessible via telnet, WWW homepages, and gopher services. http://weber.u.washington.edu/~doit/Brochures/internet_resources.html

DO-IT
College of Engineering/Computing & Communications
University of Washington
4545 15th Ave., NE, Room 206
Seattle, WA 98105-4527
(206) 685-3648 (TTY)
E-mail: doit@u.washington.edu
Homepage: http://weber.u.washington.edu/~doit/

Disability Resources Monthly (DRM)

The DRM WebWatcher - Guide to Disability Resources on the World Wide Web. http://www.geocities.com/~drm/DRMwww.html

Disability Resources, Inc.
Four Glatter Lane
Centereach, NY 11720-1032
(516) 585-0290 (Voice)
E-mail: jklauber@disabilityresources.com
Homepage: http://www.disabilityresources.com

Family Village

Family Village is a global community that integrates information, resources, and communication opportunities on the Internet for persons with mental retardation and other disabilities, their families, and those that provide them services and support. http://www.familyvillage.wisc.edu/

The Family Village
Waisman Center
University of Wisconsin-Madison
1500 Highland Avenue
Madison, WI 53705-2280
(608) 263-5973 (Voice)
E-mail: rowley@waisman.wisc.edu
Homepage: http://www.familyvillage.wisc.edu/

Indiana University Bloomington Libraries

Understanding WWW Search Tools - introduction to major search engines and the factors that determine the success of a search engine, chief among which are the size, content, and currency of the database; the speed of searching; the availability of search features; the interface design; and ease of use. http://www.indiana.edu/~librcsd/search/

Reference Department
Indiana University Bloomington Libraries
IU Main Library
Bloomington, IN 47405
(812) 855-8028 (Voice)
E-mail: libref@indiana.edu
Homepage: http://www.indiana.edu~librcsd/

National Information for Children and Youth with Disabilities (NICHCY)

Resources for Adults with Disabilities - organizations that provide information on employment, postsecondary education, accessibility and accommodation, and assistive technology. gopher://aed.aed.org:70/00/.disability/.nichcy/.online/.other/.adults/.adultspub

NICHCY
P.O. Box 1492.
Washington, DC 20013-1492
(800) 695-0285 (TTY)
E-mail: nichcy@aed.org
Homepage: http://www.nichcy.org

West Virginia Rehabilitation Research and Training Center (WVRRTC)

WVRRTC has made available its Information Technology Bookshelf manuals on the Web. http://www.icdi.wvu.edu/manuals/manuals.htm

Getting a Grip on HTML is an introduction to the use of HyperText Markup Language, the system used for developing pages for the World Wide Web and making documents accessible. http://www.icdi.wvu.edu/manuals/html/htlminst.htm

Job Hunting on the World Wide Web helps a job seeker decide which of the hundreds of job search systems will work best for them.
http://www.icdi.wvu.edu/manuals/JobHunt/JobHunt.htm

The Modem Manual covers installation and setup of modems and communication programs. http://www.icdi.wvu.edu/manuals/modem/modem.htm

The One Minute World Wide Web Master consists of 20 short exercises that develop a basic ability to access information on the World Wide Web; three browsers are covered. http://www.icdi.wvu.edu/manuals/www.www.htm

Using E-Mail to Find Disability-Related Information shows how electronic mail can be used to locate and receive information from a range of sources.
http://www.icdi.wvu.edu/manuals/email/Email.htm

WVRRTC
Barron Drive, P.O. Box 1004
Institute, WV 25112-1004
(304) 766-2680 (Voice) (304) 766-2697 (TTY)
E-mail: wvrrtc@rtc2.icdi.wvu.edu
Homepage: http://www.icdi.wvu.edu

Rehabilitation Technology Information and Resources

ABLEDATA - Assistive Technology and Disability-Related Information

AbleData Bulletin: Custom Made Products - offers information about businesses, organizations, and individuals who provide a service of designing and manufacturing custom made products for persons who have disabilities. http://www.abledata.com/bul_cust.htm

AbleData Fact Sheets on various types of assistive technology describing components, accessories, applications, and often manufacturers. http://www.abledata.com/factsht.htm

AbleData Informed Consumer Guides on assistive technology from a consumer standpoint. http://www.abledata.com/conguide.htm

ABLEDATA
8455 Colesville Road, Suite 935
Silver Spring, MD 20910-3319
(301) 588-9284 (Voice)
800/227-0216 (TTY)
Homepage: http://www.abledata.com

Illinois Assistive Technology Project (IATP)

Basic Skills in Assistive Technology - downloadable or viewable on-line lessons developed by the Illinois Assistive Technology Project. http://pursuit.rehab.uiuc.edu/pursuit/dis-resources/assistive-tech/basic-skills/basic-skills.html

Illinois Assistive Technology Project
528 S. 5th Street, Suite 100
Springfield, IL 62701
(217) 522-7985 (Voice) (217) 522-9966 (TTY)
E-mail: gunther@midwest.net

National Rehabilitation Information Center (NARIC)

NARIC's Instant Disability Information Center - the National Rehabilitation Information Center (NARIC) maintains databases containing the latest in disability information resources. http://www.naric.com/naric/search/

REHABDATA: Summaries of 51,000 documents on rehabilitation and disability research.

The NIDRR Program Directory: Descriptions of research-in-progress by 300 projects funded by the National Institute on Disability and Rehabilitation Research (NIDRR).

The NIDRR Compendium: Bibliographic citations and summaries for 2,000 documents, fact sheets, videos, brochures, and other products by NIDRR-funded projects.

The NARIC Knowledgebase: Listings for 700 "content deep" Internet sites, 1,200 organizations.

T*he NARIC Guide to Disability and Rehabilitation Periodicals*: Listing for 300 magazines, journals, and newsletters focusing on rehabilitation, disability, and assistive technology.

NARIC
8455 Colesville Road, Suite 935
Silver Spring, MD 20910-3319
(800) 346-2742 (Voice) (301) 495-5626
Homepage: http://www.naric.com/naric/home/html

Trace Research & Development Center

Designing More Accessible Web Sites: Links to cooperative efforts underway to build a more useable Web - for all. http://www.trace.wisc.edu/world/web/

Trace Center's Cooperative Electronic Library on Disability: Library of browsable disability-related text documents. http://trace.wisc.edu/tcel/index.html

Hyper-AbleData: Database listing of over 20,000 assistive technology products for people with disabilities. Contains descriptions, cost information, and pictures of 3,200 devices. http://www.trace.wisc.edu/tcel/abledata/index.html

Publications & Media: Database listing of publications with over 50,000 citations ranging from rehabilitation research to consumer information.
http://trace.wisc.edu/tcel/pmm/index.html

Trace Research & Development Center
University of Wisconsin-Madison
5901 Research Park Road
Madison, WI 53719-1252
(608) 262-6966 (Voice) (608) 263-5408 (TTY)
E-mail: web@trace.wisc.edu
Homepage: http://trace.wisc.edu

University of Washington Distance Learning

Adaptive Computer Technology - online course surveys the field of adaptive computer technology as it impacts lives of persons with disabilities, including the performance of tasks related to employment, education, and recreation.
http://weber.u.washington.edu/~study/ACT/index.html

University of Washington
Distance Learning
Box 354223
5001 25th Avenue Northeast
Seattle, WA 98105
(800) 543-2320 (Voice) (206) 543-6452 (TTY)
E-mail: distance@u.washington.edu
Homepage: http://weber.u.washington.edu/DI/

Washington Assistive Technology Alliance (WATA)

Funding for Assistive Technology - provides information on the most common funding sources and offers tips for successful funding of assistive technology devices and services.
http://wata.org/Funding_AT.html

WATA, DSHS/DVR
P.O. Box 45340
Olympia, WA 98504-5340
(360) 438-8000 (Voice) (360) 438-8644 (TTY)
E-mail: decook@u.washington.edu
Homepage: http://wata.org

Workplace Accommodations

Center for Rehabilitation (CRT)

Barrier Free Education - provides tools and strategies to accommodate specific disabilities and lessons modified to provide curriculum adaptations and interactive Listserv tools.
http://barrier-free.arch.gatech.edu/BFE

CRT
College of Architecture
Georgia Institute of Technology
490 10th Street
Atlanta, GA 30332-0156
(404) 894-4960 (Voice)
E-mail: joe.koncelik@arch.gatech.edu
Homepage: http://www.arch.gatech.edu/crt

Job Accommodation Network (JAN)

JAN provides free, practical information on employing people with disabilities and how to accommodate a person with a specific disability in a specific situation and provides information about the Americans with Disabilities Act. Americans with Disabilities Act Document Center: ADA statute, regulations, ADAAG (Americans with Disabilities Guidelines), federally reviewed tech sheets, and other assistance documents.
http://janweb.icdi.wvu.edu/kinder

Employment Tips: Employment tips, resources and publications for individuals with disabilities. http://janweb.icdi.wvu.edu/english/emptips.htm

True Success Stories from JAN. http://janweb.icdi.wvu.edu/english/stories.htm

JAN
West Virginia University
918 Chestnut Ridge Road, Suite 1
P.O. Box 6080
Morgantown, WV 26506-6080
(800) ADA-WORK (Voice/TTY) - ADA Information
(800) 526-7234 (Voice/TTY) - Accommodation Information
E-mail: jan@jan.icdi.wvu.edu
Homepage: http://janweb.icdi.wvu.edu

Maryland Division of Rehabilitation Services

Maryland's WorkTech provides links to consumer friendly publications on job accommodations strategies and the employability of persons with disabilities; workplace designs are provided for limitation of sight, total blindness, hearing or deafness, difficulty in learning, inability to use upper extremities, and incoordination or difficulty with fine dexterity. http://www.worktech.state.md.us/

Maryland's WorkTech
Maryland Rehabilitation Center
2301 Argonne Drive
Baltimore, MD 21217
(410) 554-9210 (Voice/TTY)
E-mail: rtsmrc@jagunet.com
Homepage: http://www.dors.state.md.us/

President's Committee on Employment of People with Disabilities (PCEPD)

PCEPD provides information, training and technical assistance to employers, service providers, and persons with disabilities.

Costs and Benefits of Job Accommodations. http://www.pcepd.gov/pubs/ek96/benefits.htm

Ready, Willing, and Available: A Business Guide for Hiring People with Disabilities. http://www.pcepd.gov/pubs/rwa/rwa1993.htm

Job Analyses: An Important Employment Tool from Ready, Willing, and Available. http://www.pcepd.gov/pubs/rwa/append.htm

PCEPD
1331 F. Street NW, Suite 300
Washington, DC 2004
E-mail: info@pcepd.gov
Homepage: http://www.pcepd.gov/

State Technology Projects

The Technology-Related Assistance for Individuals with Disabilities Act Amendments of 1994 provides funding to states and territories to develop and implement consumer-responsive comprehensive statewide programs of technology-related assistance for individuals with disabilities of all ages. Many states have developed assistive technology resource centers and programs, including recycling centers, equipment loan banks, equipment demonstration/training centers, alternative funding sources, statewide assistive technology conferences and more, depending on the state's need.

The RESNA Technical Assistance Project is funded by the U.S. Department of Education, National Institute on Disability and Rehabilitation Research (NIDRR) through a grant under P.L. 103-218. The purpose of the grant is to provide technical assistance and information to the 56 assistive technology projects funded under the Tech Act legislation.

RESNA Technical Assistance Project
1700 North Moore Street, Suite 1540
Arlington, VA 22209-1903
Phone: (703) 524-6686
TDD: (703) 524-6639
Internet: resnata@resna.org
Homepage: http://www.resna.org/reshome.htm

States funded under the Technology-Related Assistance for Individuals with Disabilities Act, as amended, are administered by the National Institute on Disability and Rehabilitation Research.

Alabama Statewide Technology Access and Response Project (STAR) System for Alabamians with Disabilities
2125 East South Boulevard
P.O. Box 20752
Montgomery, AL 36120-0752
Project Director: Dr. Tom Gannaway
Phone: (334) 613-3480
TDD: (334) 613-3519
Fax: (334) 613-3485
E-mail: alstar@mont.mindspring.com
Homepage: http://www.mindspring.com/~alstar

Assistive Technologies of Alaska
1016 West 6th, Suite 105
Anchorage, AK 99501
Program Director: Michael Shiffer
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http//:www.corcom.net/ata/index.html

American Samoa Assistive Technology Project
Division of Vocational Rehabilitation
Department of Human Resources
Pago Pago, American Samoa 96799
Project Director: Edmund Pereira
Phone: 0 11 (684) 699-1529
TTY: 0 11 (684) 233-7874
Fax: 0 11 (684) 699-1376

Arizona Technology Access Program (AZTAP)
Institute for Human Development
Northern Arizona University
P.O. Box 5630
Flagstaff, AZ 86011
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TTY: (520) 523-1695
Fax: (520) 523-9127
E-mail: daniel.davidson@nau.edu
Homepage: http://www.nau.edu/~ihd/aztap.html

Arkansas Increasing Capabilities Access Network (ICAN)
Arkansas Department of Workforce Education
Arkansas Rehabilitation Services
2201 Brookwood Drive, Suite 117
Little Rock, AR 72202
Project Director: Sue Gaskin
Phone: (501) 666-8868 (V/TTY)
Fax: (501) 666-5319
E-mail: sgaskin@compuserve.com
Homepage: http://www.arkansas-ican.org

California Assistive Technology System
California Department of Rehabilitation
830 K Street, Room 102
Sacramento, CA 95814
Project Director: Catherine Campisi
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Fax: (916) 323-0914
E-mail: doroa.ccampisi@hw1.cahwnet.gov
Homepage: http://www.catsca.com

Colorado Assistive Technology Project
University of Colorado Health Services Center
The Pavilion, A036-Box 13140
1919 Ogdon Street, 2nd Floor
Denver, CO 80218
Project Director: Cathy Bodine
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Fax: (303) 864-5119
E-mail: cathy.bodine@uchsc.edu

Connecticut Assistive Technology Project
Department of Social Services, BRS
25 Sigourney Street, 11th Floor
Hartford, CT 06106
Project Coordinator: John M. Ficarro
Phone: (860) 424-4881
TTY: (860) 424-4839
Fax: (860) 424-4850
E-mail: cttap@aol.com
Homepage: http://www.ucc.uconn.edu/~techact/

Delaware Assistive Technology Initiative
Center for Applied Science & Engineering
University of Delaware dupont Hospital for Children
1600 Rockland Road, Room 154
P.O. BOX 269
Wilmington, DE 19899-0269
Project Director: Beth A. Mineo Mollica, Ph.D.
Phone: (302) 651-6790
TTY: (302) 651-6794
Fax: (302) 651-6793
E-mail: dati@asel.udel.edu
Homepage: http://www.asel.udel.edu/dati/

D.C. Partnership for Assistive Technology (DCPAT)
801 Pennsylvania Avenue, SE, Suite 300
Washington, DC 20003
Project Director: Toni Fisher
Phone: (202) 546-9163
TTY: (202) 546-9168
Fax: (202) 546-9169
E-mail: tonifis@dcpat.org

Florida Alliance for Assistive Service and Technology (FAAST)
1020 E. Lafayette St., Suite 110
Tallahassee, FL 32301-4546
Project Director: Terry Ward
Phone: (850) 487-3278
Fax/TDD: (850) 487-2805
E-mail: faast@faast.org
Homepage: http://faast.org

Georgia Tools for Life
Division of Rehabilitation Services
2 Peachtree Street NW, Suite 35-413
Atlanta, GA 30303-3166
Project Director: Joy Kniskern
Phone: (404) 657-3084
TDD: (404) 657-3085
Fax: (404) 657-3086
E-mail: 102476.1737@compuserve.com

Guam System for Assistive Technology
University Affiliated Program - Developmental Disabilities
House #12 Dean's Circle
University of Guam
UOG Station
Mangilao, Guam 96923
Project Director: Ben Servino
Phone: (671) 735-2493
TDD: (671) 734-8378
Fax: (671) 734-5709
E-mail: gsat@ite.net
Homepage: http://uog2.uog.edu/uap/gsat.html

Hawaii Assistive Technology Training and Services (HATTS)
414 Kuwili Street, Suite 104
Honolulu, HI 96817
Project Director: Barbara Fischlowitz-Leong
Phone: (808) 532-7110 (V/TDD)
Fax: (808) 532-7120
E-mail: bfl@pixi.com
Homepage: http://www.hatts.org

Idaho Assistive Technology Project
129 W. Third Street
Moscow, ID 83843-4401
Project Director: Ron Seiler
Phone: (208) 885-3559
TDD: (800) IDA-TECH
Fax: (208) 885-3628
E-mail: seile861@uidaho.edu
Homepage: http://www.ets.uidaho.edu

Illinois Assistive Technology Project
1 West Old State, Capitol Plaza, Suite 100
Springfield, IL 62701
Project Director: Wilhelmina Gunther
Phone: (217) 522-7985
TDD: (217) 522-9966
Fax: (217) 522-8067
E-mail: iatp@fgi.net
Homepage: http://www.iltech.org

Accessing Technology Through Awareness in Indiana (ATTAIN Project)
1815 N. Meridian, Suite 200
Indianapolis, IN 46202
Project Manager: Cris Fulford
Phone: (317) 921-8766
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Fax: (317) 921-8774
E-mail: cfulford@indian.vinu.edu

Iowa Program for Assistive Technology (IPAT)
Iowa University Affiliated Program
University Hospital School
100 Hawkins Drive
Iowa City, IA 52242-1011
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Homepage: http://www.uiowa.edu/~infotech

Assistive Technology for Kansas Project
2601 Gabriel
P.O. Box 738
Parsons, KS 67357
Project Co-Directors: Sara Sack, Charles Spellman
Phone: (316) 421-8367
Fax: (316) 421-0954
E-mail: ssack@parsons.lsi.ukans.edu
Homepage: http://atk.lsi.ukans.edu

Kentucky Assistive Technology Services Network (KATS)
Charles McDowell Rehabilitation Center
8412 Westport Road
Louisville, KY 40242
Project Director: J. Chase Forrester
Phone: (502) 327-0022
Fax: (502) 327-9974
TTY: (502) 327-9855
E-mail: katsnet@iglou.com
Homepage: http://www.katsnet.org

Louisiana Assistive Technology Access Network (LATAN)
P.O. Box 14115
Baton Rouge, LA 70898-4115
Executive Director: Julie Nesbit
Phone: (504) 925-9500, (Voice/TTY)
Fax: (504) 925-9560
E-mail: latanstate@aol.com

Maine Consumer Information and Technology Training Exchange (CITE)
Education Network of Maine
46 University Drive
Augusta, ME 04330
Project Director: Kathleen Powers
Phone: (207) 621-3195 (V/TTY)
Fax: (207) 621-3193
E-mail: kpowers@maine.caps.maine.edu

Maryland Technology Assistance Program (TAP)
Governor's Office for Individuals with Disabilities
300 W. Lexington Street, Box 10
Baltimore, MD 21201
Project Director: Paul Rasinski
Phone: (410) 333-4975 (Voice/TTY)
Fax: (410) 333-6674
E-mail: rasinski@clark.net
Homepage: http://www.mdtap.org

Massachusetts Assistive Technology Partnership (MATP)
Children's Hospital
1295 Boylston Street, Suite 310
Boston, MA 02115
Project Director: Marylyn Howe
Phone: (617) 355-7820
TTY: (617) 355-7301
Fax: (617) 355-6345
E-mail: howe_m@al.tch.harvard.edu
Homepage: http://www.matp.org

Michigan Tech 2000
241 East Saginaw Hwy, Suite 450
Lansing, MI 48917
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E-mail: roanne@match.org
Homepage: http://www.discoalition.org

Minnesota STAR Program
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658 Cedar Street
St. Paul, MN 55155
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TTY: (612) 296-8478
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E-mail: rachel.wobschall@state.mn.us
Homepage:
http://www.state.mn.us/ebranch/admin/assistivetechnology.html

Mississippi Project START
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Jackson, MS 39215-1000
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Missouri Assistive Technology Project
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Project Director: Diane Golden, Ph.D.
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E-mail: matpmo@qni.com
Homepage: http://www.dolir.state.mo.us/matp

MonTECH Program
MUARID, The University of Montana
634 Eddy Avenue
Missoula, MT 59812
Project Director: Peter Leech
Phone: (406) 243-5676
TTY: (800) 732-0323
Fax: (406) 243-4730
E-mail: leech@selway.umt.edu

Nebraska Assistive Technology Project
301 Centennial Mall South
P.O. Box 94987
Lincoln, NE 68509-4987
Project Director: Mark Schultz
Phone: (402) 471-0734 (V/TTY)
Fax: (402) 471-0117
E-mail: mschultz@nde4.nde.state.ne.us
Homepage:
http://www.nde.state.ne.us/ATP/TECHome.html

Nevada Assistive Technology Collaborative
Rehabilitation Division
Community Based Services
711 South Stewart Street
Carson City, NV 89710
Project Administrator: Donny Loux
Phone: (702) 687-4452
TTY: (702) 687-3388
Fax: (702) 687-3292
E-mail: nvreach@powernet.net
Homepage: http://www.state.nv.us.80

New Hampshire Technology Partnership Project
Institute on Disability
The Concord Center
Ten Ferry Street, #14
Concord, NH 03301
Project Director: Jan Nisbet
Phone: (603) 224-0630 (V/TTY)
Fax: (603) 226-0389
E-mail: mjpawlek@christa.unh.edu
Homepage:
http://www.iod.unh.edu/projects/spd.htm

New Jersey Technology Assistive Resource Program (TARP)
135 East State Street, CN 398
Trenton, NJ 08625
Project Interim Director: Paul Zumoff
Phone: (609) 292-7498
TTY: (800) 382-7765
Fax: (609) 292-8347
E-mail: elenceAnjpanda.org
Homepage: http/www.njpanda.org

New Mexico Technology Assistance Program
435 St. Michael's Drive, Building D
Santa Fe, NM 87505
Project Director: Alan Klaus
Phone: (505) 827-3532 (V/TTY)
Fax: (505) 827-3746
E-mail: nmdvrtap@aol.com

New York State TRAID Project
Office of Advocate for Persons with Disabilities
One Empire State Plaza, Suite 1001
Albany, NY 12223-1150
Project Director: Deborah Buck
Phone: (518) 474-2825
TTY: (518) 473-4231
Fax: (518) 473-6005
E-mail: leffingw@emi.com
Homepage:
http://www.state.ny.us/disableadvocate/technlog.htm

North Carolina Assistive Technology Project
Department of Health and Human Services
Division of Vocational Rehabilitation Services
1110 Navaho Drive, Suite 101
Raleigh, NC 27609-7322
Project Director: Ricki Cook
Phone: (919) 850-2787 (V/TTY)
Fax: (919) 850-2792
E-mail: ncatp@mindspring.com
Homepage: http://www.mindspring.com/~ncatp

North Dakota Interagency Program for Assistive Technology (IPAT)
P.O. Box 743
Cavalier, ND 58220
Director: Judith Lee
Phone: (701) 265-4807 (V/TTY)
Fax: (701) 265-3150
E-mail: lee@pioneer.state.nd.us
Homepage: http://www.ndipat.org

Commonwealth of the Northern Mariana Islands Assistive Technology Project
CNMI Governor's Developmental Disabilities Council
Building 1312
P.O. Box 2565
Saipan, MP 96950
Project Director: Thomas J. Camacho
Phone: (670) 322-3014 (V/TTY)
Fax: (670) 322-4168
E-mail: dd.council@saipan.com
Homepage:
http://www.saipan.gov/branches/ddcouncil

Ohio TRAIN
Ohio Super Computer Center
1224 Kinnear Road
Columbus, OH 43212
Project Director: Douglas Huntt
Phone: (614) 292-2426
TTY: (614) 292-3162
Fax: (614) 292-5866
E-mail: dhuntt@mailcar.ovl.osc.edu
Homepage: http://train.ovl.osc.edu

Oklahoma ABLE TECH
Oklahoma State University Wellness Center
1514 W. Hall of Fame Road
Stillwater, OK 74078-2026
Project Manager: Linda Jaco
Phone: (405) 744-9748
V/TTY: (800) 257-1705
Fax: (405) 744-7670
E-mail: mljwell@okway.okstate.edu
Homepage: http://www.okstate.edu/wellness/at-home.htm

Oregon Technology Access for Life Needs Project (TALN)
Access Technologies, Inc.
1257 Ferry Street, SE
Salem, OR 97310
Project Director: Byron McNaught
Phone: (503) 361-1201 (V/TTY)
Fax: (503) 378-3599
E-mail: ati@orednet.org

Pennsylvania's Initiative on Assistive Technology (PIAT)
Institute on Disabilities/UAP
Ritter Hall Annex 423
Temple University
Philadelphia, PA 19122
Project Director: Amy Goldman
Phone: (800) 204-7428
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Fax: (215) 204-9371
E-mail: piat@astro.ocis.temple.edu
Homepage:
http://www.temple.edu/inst_disabilities

Puerto Rico Assistive Technology Project
University of Puerto Rico, Medical Sciences Campus
College of Related Health Professions
Office of Project Investigation and Development
Box 365067
San Juan, PR 00936-5067
Project Director: Maria I. Miranda
From U.S. Mainland: (800) 496-6035
Phone: (787) 758-2525 x4402
TTY: (809) 754-8034
Fax: (787) 762-8642
E-mail: pratp@coqui.net

Rhode Island Assistive Technology Access Project (ATAP)
Office of Rehabilitation Services
40 Fountain Street
Providence, RI 02903-1898
Project Director: Susan Olson
Phone: (401) 421-7005
TTY: (401) 421-7016
Fax: (401) 421-9295
E-mail: ab195@osfn.rhilinet.gov
Homepage: http://www.ors.state.ri.us.

South Carolina Assistive Technology Program
USC School of Medicine
Center for Developmental Disabilities
Columbia, SC 29208
Project Director: Evelyn Evans
Phone: (803) 935-5263 (V/TTY)
Fax: (803) 935-5342
E-mail: scatp@scsn.net
Homepage:
http://www.cdd.sc.edu/scatp/scatp.htm

South Dakota Assistive Technology Project (DakotaLink)
1925 Plaza Boulevard
Rapid City, SD 57702
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Fax: (605) 394-5315
E-mail: rreed@sdtie.sdserv.org
Homepage: http://www.tie.net/dakotalink

Tennessee Technology Access Project
Andrew Johnson Tower, 10th Floor
710 James Robertson Parkway
Nashville, TN 37243-0675
Project Director: Rob Roberts
Phone: (615) 532-6558
TTY: (615) 741-4566
Fax: (615) 532-6719
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Homepage:
http://www.state.tn.us/mental/ttap/htm

Texas Assistive Technology Partnership
University of Texas at Austin
College of Education, SZB252-D5100
Austin, TX 78712-1290
Project Director: Susanne Elrod
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http://www.edb.utexas.edu/coe/depts/sped/tatp/tatp.html

U.S. Virgin Island Technology-Related Assistance for Individuals with Disabilities (TRAID)
University of the Virgin Islands/UAP
#2 John Brewers Bay
St. Thomas, VI 00802-0990
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Utah Assistive Technology Program
State University
Center for Persons with Disabilities
6855 University Boulevard
Logan, UT 84322-6855
Project Director: Marvin Fifield
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E-mail: sharon@cpd2.usu.edu
Homepage:
http:/www.cpd.usu.edu/html/uatp/main.html

Vermont Assistive Technology Project
Weeks Building, First Floor
103 South Main Street
Waterbury, VT 05671-2305
Project Director: Lynne Cleveland
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E-mail: lynnec@dad.state.vt.us
Homepage:
http://www.uvm.edu/~uapvt/cats.html

Virginia Assistive Technology System (VATS)
8004 Franklin Farms Drive
P.O. Box K300
Richmond, VA 23288-0300
Project Director: Kenneth Knorr
Phone: (804) 662-9990 (V/TTY)
Fax: (804) 662-9478
E-mail: vatskhk@aol.com
Homepage:
http://www.vco.edu/rrtcweb/vats/vatsviem.htm

Washington Assistive Technology Alliance
DSHS/DVR
P.O. Box 45340
Olympia, WA 98504-5340
Project Director: Debbie Cook
Phone: (360) 438-8000
TTY: (360) 438-8644
Fax: (360) 438-8007
E-mail: debcook@u.washington.edu
Homepage: http://wata.org

West Virginia Assistive Technology System (WVATS)
University Affiliated Center for Developmental Disabilities
Airport Research and Office Park
955 Hartman Run Road
Morgantown, WV 26505
Project Manager: Jack Stewart
Phone: (304) 293-4692 (V/TTY)
Fax: (304) 293-7294
Internet: stewiat@wvnvm.wvnet.edu
Homepage:
http://www.wvu.edu/~uacdd/wvat.htm

Wisconsin Assistive Technology Program (WisTech)
Wisconsin Assistive Technology Program
Division of Supportive Living
2917 International Lane, 3rd Floor
P.O. Box 7852
Madison, WI 53704
Project Director: Julie Trampf
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Fax: (608) 243-5681
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Wyoming's New Options in Technology (WYNOT)
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Laramie, WY 82071-4298
Co-Directors: Kirk McKinney,
Thomas McVeigh
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Fax: (307) 777-7155
E-mail: tmcveigh@uwyo.edu
Homepage:
http://www.uwyo.edu/hs/wind/wynot/wynot.htm

Alliance for Technology Access

The Alliance for Technology Access (ATA) is a nationwide network of nonprofits, community-based resource centers "dedicated to providing information and support services to children and adults with disabilities and increasing their use of standard, assistive, and information technologies." Currently, there are 42 Alliance resource centers in 27 states. Some centers serve only the state in which they are located, but others provide services across state lines to surrounding counties or metropolitan areas.

Generally, Alliance centers provide information and referral, technical assistance, and training services. Alliance centers emphasize hands-on activities and many centers support assessment and evaluative services, product demonstrations, lending library resources, computer lab access, technology workshops, and professional development training. Some centers collaborate with commercial publishers to develop effective products and provide assessments, support, and technical assistance.

Consult the following organizations in your state for more information about the services they provide.

National Office

Alliance for Technology Access
2175 East Francisco Boulevard, Suite L
San Rafael, CA 94901
Phone: (415) 455-4575
TTY: (415) 455-0491
E-mail: atainfo@atacess.org
Homepage: http://www.atacess.org/

Resource Centers

Alabama
Birmingham Alliance for Technology Access Center
Birmingham Independent Living Center
206 13th Street South
Birmingham, AL 35233-1317
(205) 251-2223 (Voice/TTY)
E-mail: dankess@ix.netcom.com

Technology Assistance for Special Consumers
P. O. Box 443
Huntsville, AL 35804
(205) 532-5996 (Voice/TTY)
E-mail: tasc@traveller.com
Homepage: http://tasc.ataccess.org

Alaska
Alaska Services for Enabling Technology
P. O. Box 6485
Sitka, AK 99835
(907) 747-7615
E-mail: asetseak@aol.com

Arizona
Technology Access Center of Tucson
P. O. Box 13178
4710 East 29th Street
Tucson, AZ 85732-3178
(520) 745-5588, ext. 412
E-mail: tactaz@aol.com

Arkansas
Technology Resource Center
c/o Arkansas Easter Seal Society
3920 Woodland Heights Road
Little Rock, AR 72212-2495
(501) 227-3600
E-mail: atrce@aol.com

California
Center for Accessible Technology
2547 8th St., 12-A
Berkeley, CA 94710-2572
(510) 841-3224 (Voice/TTY)
E-mail: cforat@aol.com
Homepage: http://www.el.net/CAT

Computer Access Center
P. O. Box 5336
Santa Monica, CA 90409
(310) 338-1597
E-mail: cac@cac.org
Homepage: http://www.cac.org

Sacramento Center for Assistive Technology
701 Howe Avenue, Suite E-5
Sacramento, CA 95825
(916) 927-7228
E-mail: scat@quiknet.com
Homepage: http://www.quiknet.com/~scat

SACC Assistive Technology Center
Simi Valley Hospital, North Campus
P.O. Box 1325
Simi Valley, CA 93062
(805) 582-1881
E-mail: dssaccca@aol.com

Team of Advocates for Special Kids
100 W. Cerritos Ave.
Anaheim, CA 92805-6546
(714) 533-8275
E-mail: taskca@aol.com

Florida
CITE, Inc. - Center for Independence,
Technology & Education
215 E. New Hampshire St.
Orlando, FL 32804
(407) 898-2483
Email: comcite@aol.com

Georgia
Tech-Able, Inc.
1112-A Brett Drive
Conyers, GA 30094
(770) 922-6768
E-mail: techable@america.net
Homepage: http://www.onramp.net/tech-able

Hawaii
Aloha Special Technology Access Center
710 Green St.
Honolulu, HI 96813
(808) 523-5547
E-mail: stachi@aol.com
Homepage: http://www.aloha.net/~stachi

Idaho
United Cerebral Palsy of Idaho, Inc.
5530 West Emerald
Boise, ID 83706
(208) 377-8070
E-mail: ucpidaho@aol.com

Illinois
Northern Illinois Center for Adaptive
Technology
3615 Louisiana Road
Rockford, IL 61108-6195
(815) 229-2163
E-mail: ilcat@aol.com

Technical Aids & Assistance for the Disabled
Center
1950 West Roosevelt Road
Chicago, IL 60608
(312) 421-3373 (Voice/TTY)
(800) 346-2939
E-mail: taad@interaccess.com
Homepage:
http://homepage.interaccess.com/~taad

Indiana
Assistive Technology Training and Information Center
Attic: A Resource Center on Independent Living
P. O. Box 2441
Vincennes, IN 47591
(812) 886-0575 (Voice/TTY)
E-mail: inattaic1@aol.com

Kansas
Technology Resource Solutions for People
1710 West Schilling Road
Salina, KS 67401
(913) 827-9383
E-mail: trspks@aol.com

Kentucky
Bluegrass Technology Center
169 N. Limestone Street
Lexington, KY 40507
(606) 255-9951
E-mail: bluegrass@uky.campus.mci.net
Homepage:
http://www.kde.state.ky.us/assistive/
Assistive_ Technology.html

Enabling Technologies of Kentuckiana
Louisville Free Public Library
301 York Street
Louisville, KY 40203-2257
(502) 574-1637
(800) 890-1840 (KY)
E-mail: entech@iglou.com
Homepage:
http://www.kde.state.ky.us/assistive/
Assistive_Technology.html

Western Kentucky Assistive Technology Consortium
P. O. Box 266
Murray, KY 42071
(502) 759-4233
E-mail: wkatc@mursuky.campus.mci.net
Homepage:
http://www.kde.state.ky.us/assistive/Assistive_Technology.html

Maryland
Learning Independence Through Computers, Inc. (LINC)
1001 Eastern Avenue, 3rd floor
Baltimore, MD 21202
(410) 659-5462 (Voice)
(410) 659-5472 (Fax/TTY)
E-mail: lincmd@aol.com
Homepage: http://www.linc.org

Michigan
Michigan's Assistive Technology Resource
1023 S. US 27
St. Johns, MI 48879-2424
(517) 224-0333 (Voice/TDD)
(800) 274-7246 (Voice/TDD))
E-mail: matr@match.org

Minnesota
PACER Computer Resource Center
4826 Chicago Avenue South
Minneapolis, MN 55417-1055
(612) 827-2966 (Voice/TTY)
E-mail: pacercrc@aol.com
Homepage: http://www.pacer.org/crc/crc.htm

Missouri
Technology Access Center
12110 Clayton Road
St. Louis, MO 63131-2599
(314) 569-8404 (Voice)
(314) 569-8446 (TTY)
E-mail mostltac@aol.com

Montana
Parents, Let's Unite for Kids
MSU-B/SPED Bldg., Room 267
1500 N. 30th Street
Billings, MT 59101-0298
(406) 657-2055
(800) 222-7585 (MT)
E-mail: plukmt@aol.com

New Jersey
TECH Connection
Assistive Technology Solutions
c/o Family Resource Associates, Inc.
35 Haddon Avenue
Shrewsbury, NJ 07702-4007
(908) 747-5310
E-Mail: tecconn@aol.com

Center for Enabling Technology
622 Route 10 West, Suite 22B
Whippany, NJ 07981
(973) 428-1455 (Voice)
(973) 428-1450 (TTY)
E-mail: cetnj@aol.com

New York
Techspress Resource Center for Independent Living
P. O. Box 210
401-409 Columbia Street
Utica, NY 13503-0210
(315) 797-4642
E-mail: lana.gossin@rcil.com

North Carolina
Carolina Computer Access Center
Metro School
700 East Second Street
Charlotte, NC 28202-2826
(704) 342-3004
E-mail: ccacnc@aol.com
Homepage:
http://www.charweb.org/health/ccac.html

Ohio
Technology Resource Center
301 Valley St.
Dayton, OH 45404-1840
(513) 222-5222
E-mail: trcdoh@aol.com

Rhode Island
TechACCESS Center of Rhode Island
110 Jefferson Boulevard
Warwick, RI 02888
(401) 463-0202
(800) 916-TECH (RI)
E-mail: techaccess@techaccess-ri.org

Tennessee
East Tennessee Technology Access Center
3525 Emory Road, NW
Powell, TN 37849
(423) 947-2191 (Voice/TTY)
E-mail: etstactn@aol.com
Homepage: http://www.kornet.org/ettac/

Technology Access Center of Middle Tennessee
Fountain Square, Suite 126
2222 Metrocenter Blvd.
Nashville, TN 37228
(615) 248-6733 (Voice/TTY)
(800) 368-4651
E-mail: tac.tn@nashville.com

West Tennessee Special Technology Access Resource Center (STAR)
P. O. Box 3683
60 Lynoak Cove
Jackson, TN 38305
(901) 668-3888
(800) 464-5619
E-mail: mdoumitt@starcenter.tn.org
Homepage: http://www.starcenter.tn.org

Utah
The Computer Center for Citizens with Disabilities
c/o Utah Center for Assistive Technology
2056 South 1100 East
Salt Lake City, UT 84106
(801) 485-9152 (Voice/TTY)
E-mail: cboogaar@usoe.k12.ut.us

Virgin Islands
Virgin Islands Resource Center for the Disabled, Inc.
P. O. Box 308427
St. Thomas, VI 00803-8427
(809) 777-2253
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Virginia
Tidewater Center for Technology Access
Special Education Annex
960 Windsor Oaks Blvd.
Virginia Beach, VA 23462
(757) 474-8650
E-mail: tcta@aol.com
Homepage: http://tcta.ataccess.org

West Virginia
Eastern Panhandle Technology Access Center, Inc.
P. O. Box 987
300 S. Lawrence St.
Charles Town, WV 25414
(304) 725-6473
E-mail: eptac@earthlink.net

Rehabilitation Engineering Research Centers

Rehabilitation Engineering Research Centers (RERCs) are funded by the National Institute on Disability and Rehabilitation Research (NIDRR) to develop and test new engineering solutions to problems related to disabilities. RERCs conduct research and work to transfer the information gained on rehabilitation technologies into rehabilitation practice. The centers' additional responsibilities include developing systems for the exchange of technical and engineering information and improving the distribution of technological devices and equipment to individuals with disabilities. Information is disseminated through articles, monographs, training curricula, and other publications.

Each of the centers specializes in a unique area. RERCs provide technical information on rehabilitation technology and some are co-located with programs that offer direct services to individual consumers. They can be a good referral source.

The following centers were funded at time of document development. For a current list, contact The National Institute on Disability and Rehabilitation Research, U. S. Department of Education, 600 Independence Avenue, S.W., Washington, DC 20202-2572 or visit NARIC's homepage http://www.naric.com/naric/services.html.

Quantification of Physical Performance
Ohio State University
1036 Dodd Hall
480 West Ninth Avenue
Columbus, OH 43210-1290
Homepage: http://www. ortho.ohio-state.edu/RERC/RERC.html
(614) 293-3808 (V/TTY)

Accessible and Universal Design in Housing
North Carolina State University School of Design
Center for Universal Design
Box 8613
Raleigh, NC 27695-8613
Homepage: http://www.design.ncsu.edu/cud
(800) 647-6777 (V/TTY)

Hearing Enhancement and Assistive Devices
The Lexington Center, Inc.
Research Division
30th Avenue and 75th Street
Jackson Heights, NY 11370
Homepage: http://idt.net/~reslex
(718) 899-8800 (V), (718) 899-3030 (TTY)

Assistive Technology for Older Persons with Disabilities
State University of New York (SUNY)/ Buffalo
Center for Assistive Technology
515 Kimball Tower
Buffalo, NY 14214
Homepage:
http://wings.buffalo.edu/ot/cat/rerca.htm
(800) 628-2281

Technology Evaluation and Transfer
State University of New York (SUNY)/Buffalo
Center for Assistive Technology
515 Kimball Tower
Buffalo, NY 14214
Homepage:
http://cosmos.ot.buffalo.edu/aztech.html
(716) 829-3141 (V); (800) 628-2281 (TTY)

Modifications to Worksites and Educational Settings
Cerebral Palsy Research Foundation of Kansas
5111 East 21st Street
P. O. Box 8217
Wichita, KS 67208-0217
Homepage: http://www.engr.twsu.edu/cpr-wsu
(316) 688-1888 (V/TTY)

Prosthetics and Orthotics
Northwestern University
Rehabilitation Engineering Research Program
and Prosthetics Research Laboratory
Chicago, IL 60611
Homepage: http://www.repoc.nwu.edu
(312) 908-6524, (312) 908-6526 (Fax/TTY)

Universal Telecommunications Access
Gallaudet University
Technology Assessment Program
800 Florida Avenue Northeast
Washington, DC 20002
Homepage: http://tap.gallaudet.edu/RERC_UTA
(202) 651-5257 (V-TTY)

Rehabilitation Robotics to Enhance the Functioning of Individuals with Disabilities
Applied Science and Engineering Laboratories
University of Delaware
duPont Hospital for Children
1600 Rockland Road
Wilmington, DE 19899
Homepage: http://www.asel.udel.edu
(302) 651-6799 (V), (302) 651-6834 (TTY)

Augmentative Communication
Applied Science and Engineering Laboratories
University of Delaware
duPont Hospital for Children
1600 Rockland Road
Wilmington, DE 19899
Homepage: http://www.asel.udel.edu
(302) 651-6830 (V), (302) 651-6834 (TTY)

Smith-Kettlewell Rehabilitation Engineering Research Center
Smith-Kettlewell Eye Research Institute
2232 Webster Street
San Francisco, CA 94115
Homepage: http://www.ski.org/rerc
(415) 561-1620

Children with Orthopedic Disabilities
Los Amigos Research and Education Institute, Inc. (LAREI)
Rancho Los Amigos Medical Center
12841 Dahlia Street, Building 306
Downey, CA 90242
Homepage: http://ranchorep.org
(562) 401-7994 (V), (562) 803-4533 (TTY)

Low Back Pain
University of Vermont
Vermont Back Research Center
One South Prospect Street
Burlington, VT 05401
Homepage:
http://www.salus.med.uvm.edu/~backtalk
(800) 527-7320 (V/TTY)
(800) 656-4582 (V/TTY)

Technology to Improve Wheelchair Mobility
University of Pittsburgh
Rehabilitation Technology Program
Forbes Tower, Suite 5044
Pittsburgh, PA 15260
Homepage:
http://128.147.90.92/rtp/RERCHP.html
(412) 647-1273 (V), 412/647-1291 (TTY)

Information Technology Access
Trace Research and Development Center
University of Wisconsin-Madison
5901 Research Park Boulevard
Madison, WI 53719-1252
Homepage: http://www.trace.wisc.edu
(608) 263-6966 (V), (608) 263-5408 (TTY)

Recruitment - How to Find AT Personnel

Rehabilitation Recruitment Center
National Clearinghouse of Rehabilitation Training Materials
Oklahoma State University
5202 Richmond Hill Drive
Stillwater, OK 74078-4080
(800) 223-5219
(405) 624-7650
Fax: (405) 624-0695
TTY: (405) 624-3156
Homepage: http://www.nchrtm.okstate.edu/rrc

RESNA
1700 North Moore Street, Suite 1540
Arlington, VA 22209-1903
(703) 524-6686 (Voice), (703) 524-6639 (TTY)
Homepage: http://www.resna.org

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Rehabilitation Engineering Technology Training
1600 Holloway Avenue
San Francisco, CA 94132
(415) 338-1333

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Mechanical Engineering Department
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(615) 322-0842

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P. O. Box 500
Randolph Center, VT 05061
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Rehabilitation Technology Program
University of Virginia Health Science
Box 30 BRN
Charlottesville, VA 22901
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Assistive Technology Resource Center
University of Washington
Box 357920
Seattle, WA 98195-7920
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